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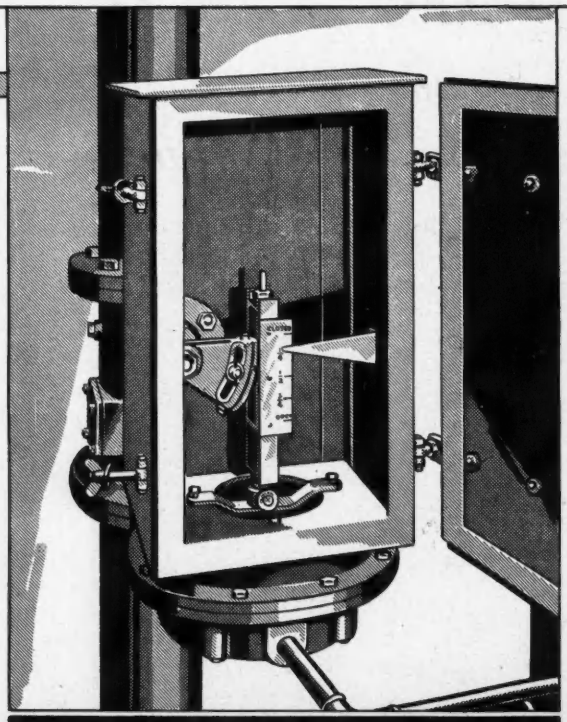

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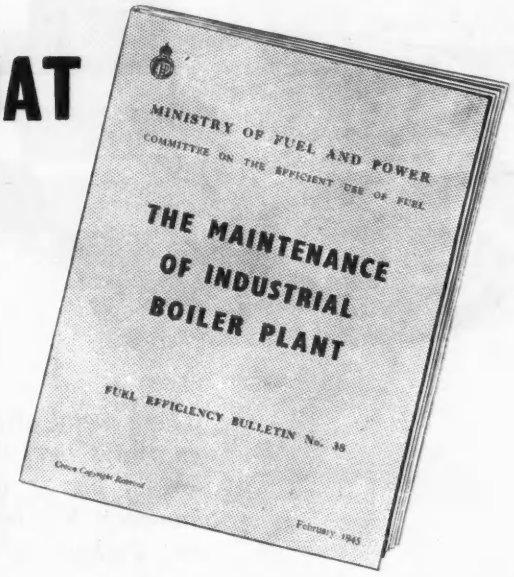
MINISTRY OF FUEL AND POWER
COMMITTEE ON THE EFFICIENT USE OF FUEL
THE MAINTENANCE OF INDUSTRIAL BOILER PLANT
FUEL EFFICIENCY BULLETIN No. 38
February 1945

Fuel Efficiency Bulletin No. 38—"*The Maintenance of Industrial Boiler Plant*" offers under one cover much useful information. It not only lists many common and uncommon maintenance problems, but describes how to deal with them. It is a handbook for the man on the job—it is up to management to see he gets it.

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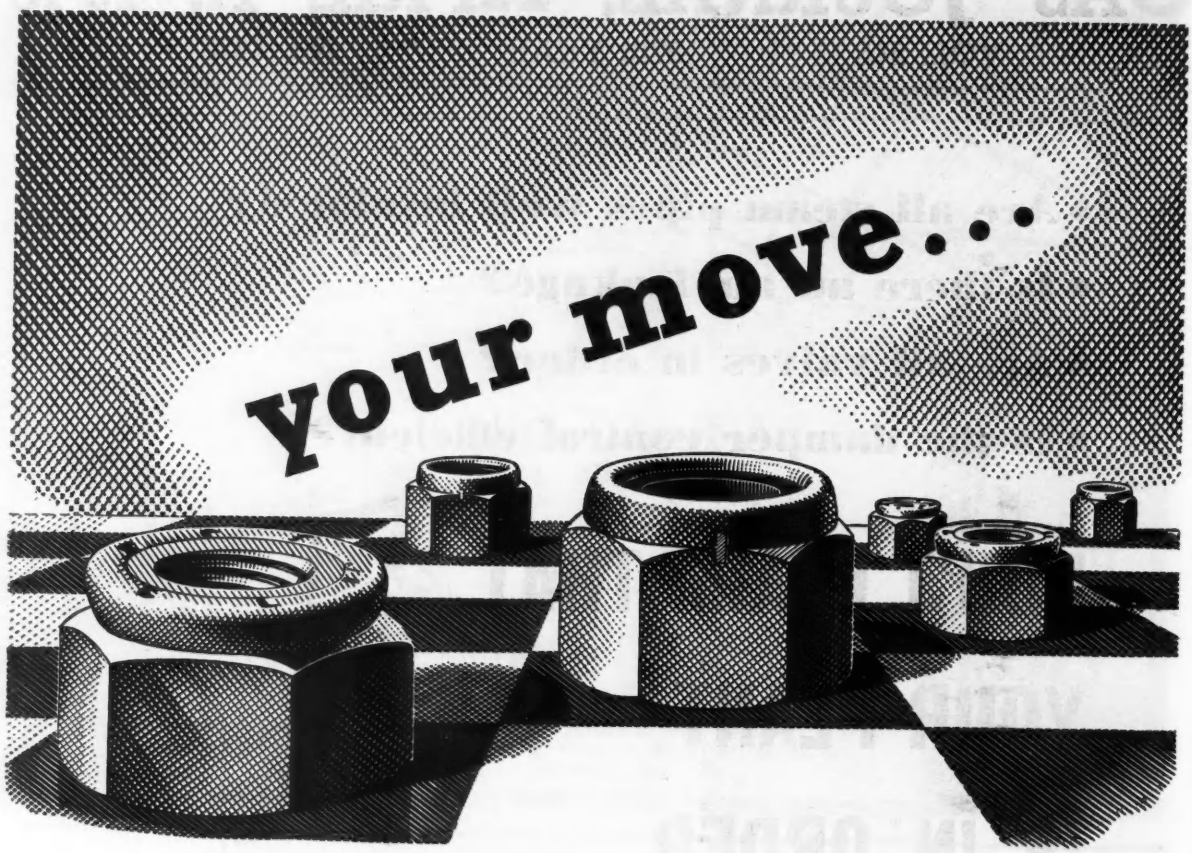

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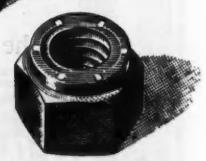

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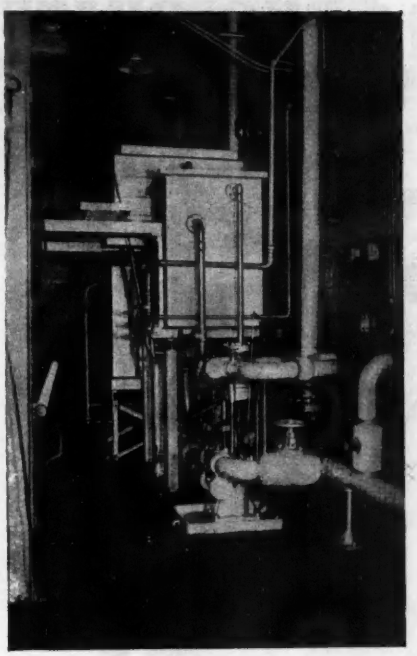

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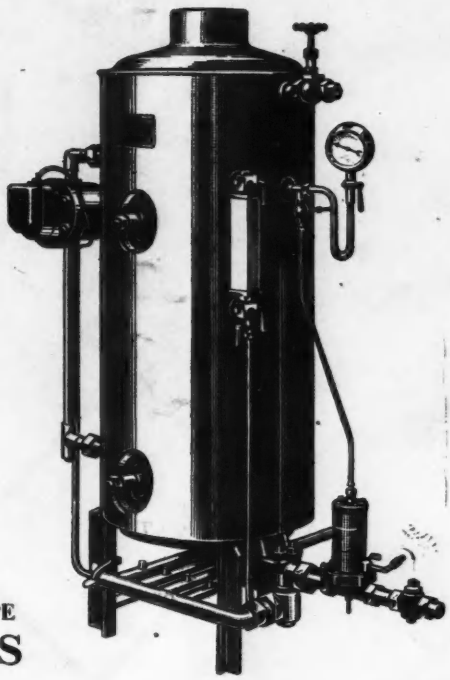

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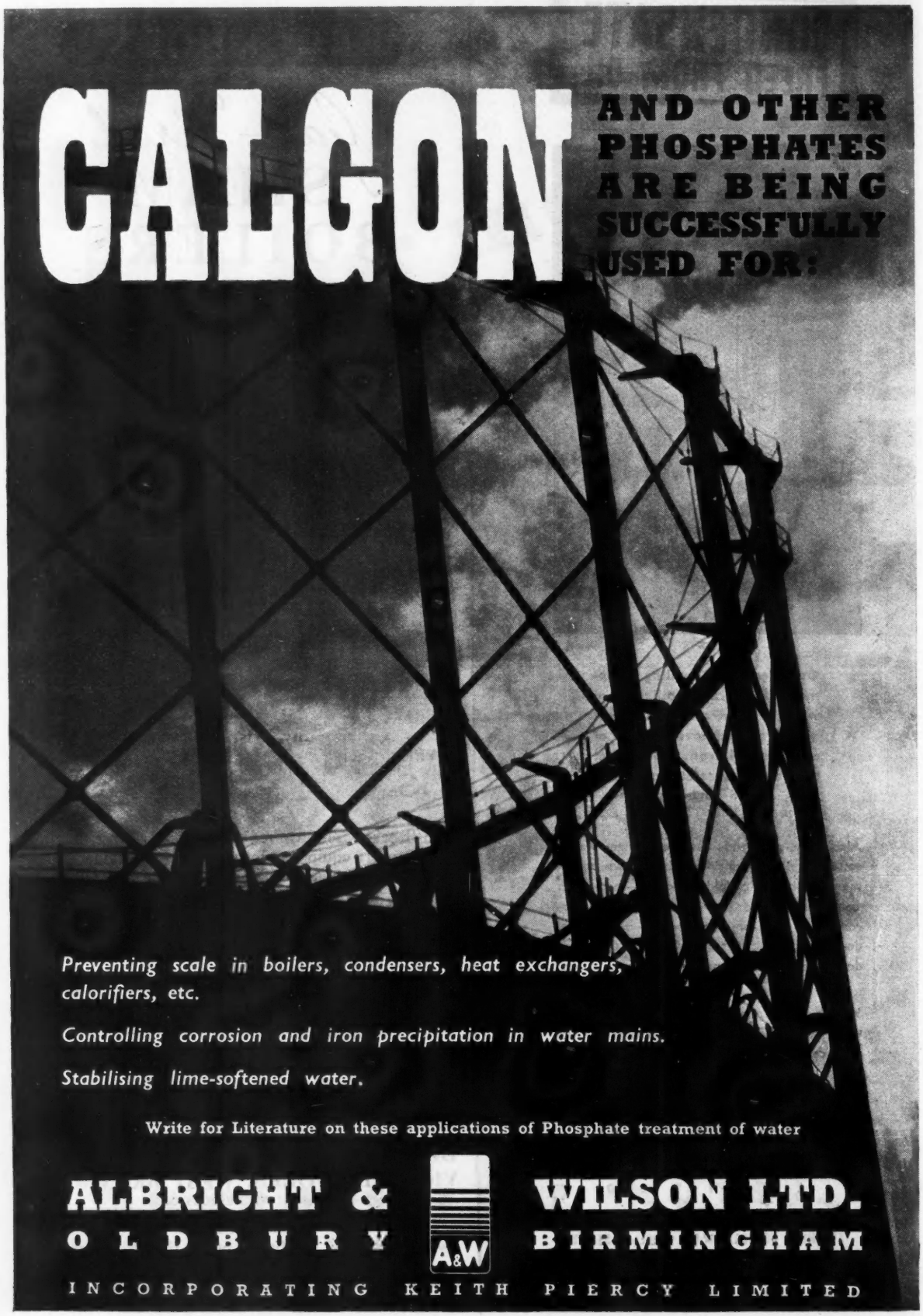

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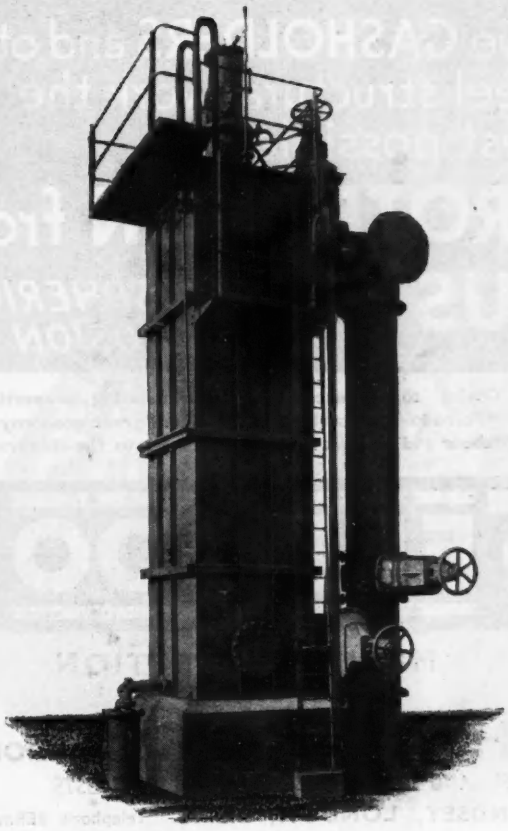

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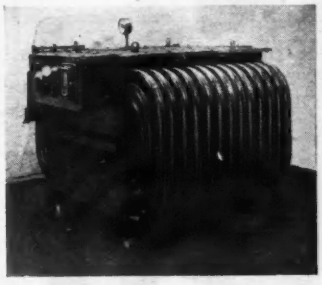

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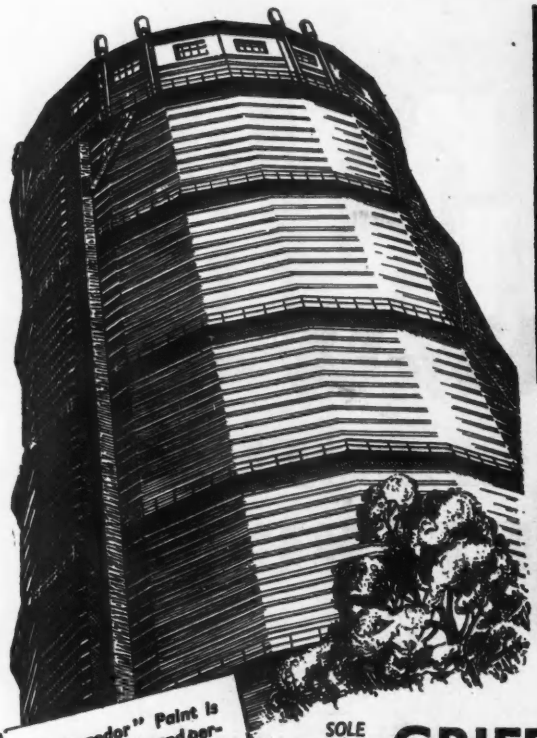

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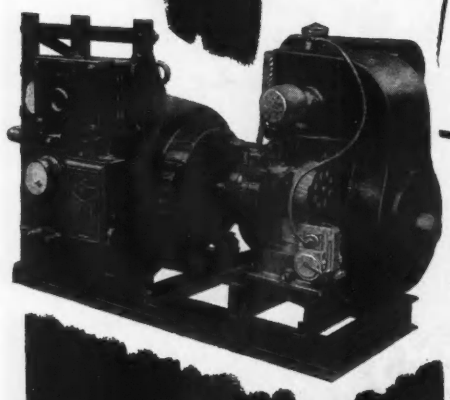

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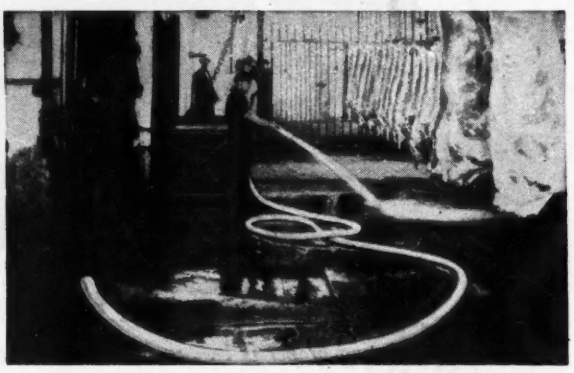

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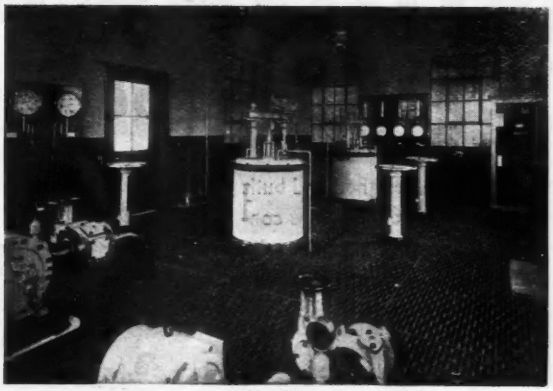

Fig. 328

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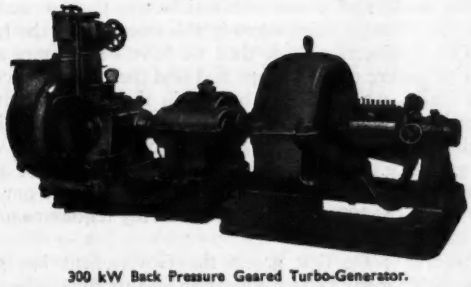

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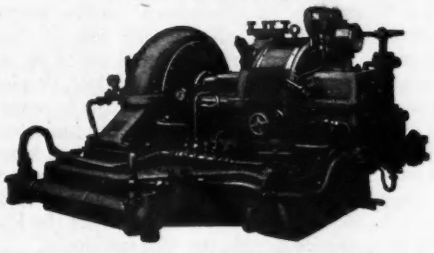

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GAS JOURNAL, APRIL 11, 1945

VOL. 245 97th YEAR No. 4273

EDITORIAL NOTES

COAL AND PUBLIC SERVICES

OUR issue to-day contains a brief report of the 13th annual meeting of the Conjoint Conference of Public Utility Associations, at which meeting the President, Lord Falmouth, had much of importance to relate. His Address threw light on the achievements of an organization the activities of which call for more widespread recognition than has so far been accorded them The services of the public utility undertakings covered by the Conference—gas, electricity, water, and now for the first time public transport—are far too little realized by a public which takes them for granted, knows little or nothing of their magnitude and of the complicated organizations required to keep them going, and is in general ignorant of the constant effort to effect improvement while at all times maintaining supply. The war years have been an ordeal, a time of real test; the public services have stood up to very great difficulties in a truly remarkable way. While past difficulties have been great, it is equally apparent that the future holds out many problems for the public utility services. In the Conference, with the strength and influence accumulated over the 20 years since its inception, lies a powerful instrument for help and guidance in matters where there is common ground, and particularly in the framing of legislation. Indicative of this was the solid work of the Conference in connexion with the Town and Country Planning (Interim Development) Act, 1943, and the Town and Country Planning Act, 1944.

We have had a good deal to say during the past twelve months and more of the continued anxiety occasioned by the coal situation. That the situation remains so unsatisfactory from the point of view of the public utilities is certainly not due to any lack of effort made by the Conjoint Conference during 1944—a fact brought out in the annual report of the Conference and also in the Address by Lord Falmouth. If to date largely negative in result, as is unfortunately the case, the activities of the Conference in this direction can still be regarded as a useful contribution to the national cause. The persistent endeavours to secure some improvement in the deplorable state of affairs have admittedly been put forward by the Conference on behalf of its members; nevertheless these endeavours must indirectly have constituted a service to the whole community. There must be few consumers in the country who have not good reason to complain of the price and quality of the coal with which they are supplied and of the difficulty of obtaining enough to meet their barest requirements. The protests made and the suggestions put forward by the Conference must be least have kept those concerned painfully alive to the general dissatisfaction which exists. Even so, the position seems to get worse rather then better. As prices soar, output declines, despite the National Minimum Wage settlement and periodic wage increases, and the annual report of the Conference indicates—as recent statements by the coal industry ("JOURNAL" of March 7 and April 4) have sought to substantiate—that the introduction of some relativity between price and quality would mean a further increase in the price of clean coal to meet the loss of revenue which the collieries would otherwise sustain.

The year 1944 was in fact for the Conference one of special and urgent representations to the Ministry of Fuel and Power. Early in the year there was falling-off of supplies of coal, with consequent depletion of stocks; there was danger that some undertakings would be unable to maintain the supply of gas. Recognizing the importance of preventing this, the Ministry diverted to the public utilities supplies destined for other consumers. The action, however, was a palliative only, not a remedy. There were increases in price amounting to an average of 7s. a ton, unaccompanied, however, by any improvement in quality. There was interview with the Controller-General, who held out no immediate hope of a price reduction unless output could be increased. A request was then put forward that only fuel suitable for the purposes for which it was required should be dispatched to the utilities; the answer was given that it was not possible in the circumstances to depart from the flat rate policy. Turning to a demand previously made that machinery should be set up so that disputes as to price and quality between individual undertakings and their coal supplies might be dealt with, the Conference maintained there should be a right to demand arbitration; reply was made that the collieries could not be asked to undertake the additional burden which arbitration procedure would involve. It was pointed out that nothing concrete was being done to ameliorate the situation. This led to joint discussion between the Controller-General, the Chairman of the Mining Association, and the Chairman of the Conference Council, which in turn led to the suggestion that an arrangement might be made whereby individual undertakings which had received coal of a poor quality and were not able to obtain redress should be able to submit their case to a joint committee composed of an equal number of members of the Council of the Conference and of the Mining Association which would give a decision. Agreement was reached on this arrangement, but it is obvious that decisions reached under it will have no legal sanction.

AFTER DEMOBILIZATION

A FORTNIGHT ago in these columns we discussed in general terms the Gas Industry's intentions and plans—which means, of course, the summation of the plans and intentions of individual gas undertakings—in regard to the rehabilitation of personnel returning from the Services or from other war activities outside the Industry. We wrote, and, we think, justifiably, in optimistic vein, emphasizing, however, that individual undertakings should make their plans known clearly to those serving overseas. Naturally much will depend on the co-ordination of the work, and it was with satisfaction that we were able to refer to the steps being taken in this direction by the Institution of Gas Engineers. Since then we have heard more about the specific nature of these steps and find the outlook encouraging. For clarity we would set out again that the problem divides itself broadly into two parts. In the first place there is the gas engineer; there is also the large category covering the wide field of gasfitting. The needs of these two classes of personnel obviously differ; and we gave a broad idea in our issue of March 28 (p. 399) of how these differing requirements were to be met.

Regarding the first group the Government has stated its proposals for the further education and training of professional personnel returning to civilian occupations from the Forces or other work of national importance. The Institution has been in continuous negotiation with the Ministries of Education and of Labour and National Service, and now has under consideration the initiation of refresher courses for gas engineers at appropriate centres in the country, and in this regard there is no doubt that individual undertakings could help in the practical organization of suitable schemes, working through the Institution towards this end. Apart from the Government's scheme some gas undertakings maybe are considering the provision of refresher courses for their own engineers, and here we would point to the

possibilities of making proposed courses available to engineers from neighbouring undertakings. Effective collaboration is a primary essential.

Then comes the gasfitter; and, as we pointed out on March 28, the gasfitter falls into one of two classes. First we have the fully trained fitter who was a journeyman before joining H.M. Forces or undertaking work of national importance outside the Gas Industry. Secondly there is the apprentice or trainee whose apprenticeship was interrupted by war service. In regard to the provision of refresher courses for fully trained gasfitters, no specific arrangements are at present contemplated by the Government, the view being held that the Gas Industry itself should undertake the responsibility of initiating and conducting suitable courses for its trained fitters returning to civilian employment. It is not envisaged that any financial support for such refresher courses will be forthcoming from the Government, and it is assumed that the cost will be borne by the undertakings themselves. There does not appear to be any advantage in preparing a standardized refresher course for gasfitters; the facilities and requirements of the different undertakings throughout the country vary too much. The Institution has, however, been working on the matter. Particulars of courses which various gas undertakings are proposing to conduct have been collated; through the Institution as a central link there is available to all information concerning the applicability of these courses to personnel of neighbouring undertakings. In brief, the Institution is in a position to offer help and advice on this all-important problem, though the final details, including any financial aspects, must remain a matter of mutual agreement between the undertakings concerned.

Finally, an outline of the Government's proposals for dealing with interrupted apprenticeships was published in October last (*Ministry of Labour Gazette* of that month). The Ministry of Labour and National Service is collaborating with the Federation of Gas Employees in the administration of this scheme. And here again, through the Federation, help and advice are made available to the individual gas undertaking. The success of the plans will depend on individual action coupled with full collaboration; but, as we have indicated, the outlook is encouraging.

Smokeless Zones

The National Smoke Abatement Society has renewed its proposals for ending the smoke nuisance by the setting up of smokeless zones, the idea being that in such zones the emission of any smoke would be an offence, and that a beginning should be made with zones in central and reconstructed areas. The argument is advanced that, once they were established, and as improved appliances and smokeless fuels became fully available, the initial zones could be progressively expanded until, after a period of about 10 years, the whole of the towns would enjoy smokeless air, and that post-war reconstruction affords a unique series of opportunities for making a resolute attack. The recommendations are set out in a new booklet published by the Society at Chandos House, Buckingham Gate, S.W. 1 (3d. post free).

The Society points out that in many of the provincial cities, and in the City of London, central areas have been damaged or devastated by enemy action. Reconstruction of these areas without a conscious effort to ensure their complete smokelessness would be lamentably short-sighted, and would mean an entirely unnecessary perpetuation of the smoke nuisance. The new buildings to be erected should be smokeless themselves, and should not be forced to suffer rapid degradation by blackening and corrosion because of smoke-emitting neighbours. The establishment of central areas as smokeless zones would provide an important object lesson impressing on the public the feasibility of reform on a larger scale.

The question arises: "Would the prevention of smoke in one area only, perhaps a relatively small part of a large town, have any noticeable effect?" The answer given by the Society is that the extent of the improvement would, of course, depend upon the size of the area and the day-to-day weather conditions. On calm days the reduction in pollution would be less than when the air was turbulent. Tests made in Hyde Park, London, showed that on turbulent days pollution was only 27% that of the surrounding area, and on calm days, when pollution generally was high, pollution in the Park was 85%. The deposit of larger smuts, which are particularly objectionable, and which fall near to their source of origin, will in particular be reduced in a smokeless area. Thus even if a smokeless zone is surrounded by smoke-producing areas, some improvement in conditions can be expected. There would, however, be little value in setting up such zones if they were to remain small and isolated indefinitely. One must begin somewhere, and the first smokeless zones must be regarded only as the beginning—as the bridgeheads of the attack.

In comparison with other schemes that have been propounded from time to time, it is maintained by the Society that the legislative requirements and administration of smokeless zones can be made very simple and definite. The first stage would be a provision in an appropriate Act of Parliament, such as one of the subsequent or consolidating Acts which are expected to follow the present Town and Country Planning Bill dealing with war-damaged towns, giving local authorities power to make by-laws under which areas as specified in the by-laws could be declared to be smokeless zones. Such by-laws would make the emission in the area specified of *any* smoke—*i.e.*, smoke of any colour or of any density—a statutory nuisance (a "smoke nuisance") under the Public Health Act, 1936.

"Electricity Supply: The Voice of Authority"

Such is the title of a booklet dealing with the past, present, and future of the electric power companies, just issued by the Incorporated Association of Electric Power Companies, which embraces undertakings together having an area of supply covering two-thirds of Great Britain. The contentions are that (*a*) to revolutionize the industry to-day would be to court disaster, with adverse consequences extending far beyond the industry itself; (*b*) 40 years of free enterprise show a remarkable record of progress, which is concrete proof of efficiency, The Association, having claimed for the power companies almost sole credit for the progress of rural electrification, goes on to say that (1) the companies are, and always have been, the cheapest providers of electricity for power consumers; (2) in the case of supplies of electricity to domestic consumers, the prices of power companies are, in certain areas, a little higher than local authorities, which disparity, however, is in no degree attributable to inefficiency on the part of the companies, but to the higher cost of supplying the sparsely populated areas; (3) the companies' average selling price to power *and* domestic consumers during 1937–38 (the last available official statistics) was 15% less than the local authorities.

And what of the future? "Spending at the rate of £10,000,000 a year on distribution, every undeveloped or partially developed area throughout the whole of the companies' widespread territories is scheduled for further supplies. Soon there will be not a single community of over 50 people—*i.e.*, of more than 12 houses—without an electricity supply available. Over 200,000 dwellings—great numbers of them farms and others in places so remote that they were out of reach before the war—come into the scheme. So complete are the details of all these schemes that the power companies await only the removal of wartime restrictions on labour and materials in order to go ahead. They stand by, ready and waiting. Simultaneously with the planning of engineering, technical, and administrative developments, the power companies have been studying how best to secure a still better diversity of load. Plans for the greater standardization of voltages have been submitted to the Electricity Commissioners, and proposals for more uniformity in charges are in preparation. There are no improvements which the industry cannot itself be trusted to carry out."

The concluding paragraph of the booklet reads thus: "The public has so far had no opportunity of voicing its wishes. But the Incorporated Association of Electric Power Companies firmly believes that the verdict of the level-headed British public could be summed up in a sentence: It would be folly to scrap the experience and practice which has made the industry the success it is to-day for an experiment in political dogma, which would be revolution without even the promise of evolution."

Mr. H. J. Arnold, Hon. Secretary of the Gas Staff Association from its inception, who was appointed paid full-time Organizing Secretary on Feb. 14, has obtained leave of absence from the Gas Light and Coke Company, and took up his new duties officially on Mar. 5, at 36, Parkthorne Drive, North Harrow. Mr. W. H. Davey, Press and Publicity Officer, reports that the committee that has been engaged for several months in redrafting the constitution to include complete regional organization covering the whole of Great Britain and Northern Ireland has nearly completed its work, and the revised constitution for a national organization will be submitted to the annual meeting in London in May. A national campaign for the support of gas staffs all over the country is under consideration. Several branches outside London have already been formed.

Personal

Mr. A. W. SMITH, C.B.E., who has recently retired from the position of General Manager and Secretary of the City of Birmingham Gas Department, has accepted an invitation to join the Board of the Midland Tar Distillers, Ltd., as from July 1 next.

* * *

Following the promotion of Mr. A. W. Lee, the Birmingham Gas Committee have appointed Mr. E. A. GOODLAND, B.A., A.M.I. Chem.E., as Assistant Manager and Secretary. Mr. Goodland was educated at St. Catherine's College, Cambridge University—where he obtained an Honours Degree—and University College, London. He became a College Apprentice at the United Steel Companies, Sheffield, and later took up an appointment with the Workington Iron and Steel Company. In August, 1939, he joined the Royal Corps of Signals and served with the B.E.F. in France, attaining the rank of Captain. He was mentioned in Despatches. Mr. Goodland was subsequently released from the Forces to undertake duties with the Appleby-Frodingham Steel Company. His commercial background covers a wide range from both a technical and an administrative point of view, and his studies have taken him to Germany, Czecho-Slovakia, and Greece.

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Mr. HENRY SHACKLETON, Chief Assistant Engineer and Manager to the Nelson (Lancs) Corporation Gas Department, has been appointed Engineer and Manager of the Gainsborough U.D.C. Gas Undertaking in succession to Mr. J. A. Derbyshire.

* * *

Mr. J. R. W. ALEXANDER has been elected a Fellow of S.S. Mary and Nicolas, the Corporation—founded by Canon Nathaniel Woodard in 1848—which governs the 16 Woodard Schools. Eight of these public schools (Lancing, Hurstpierpoint, Ardingley, Bloxham, Denstone, Ellesmere, Worksop, and Taunton) are for boys and eight for girls.

* * *

Mr. N. B. THOMPSON, Engineer, General Manager, and Secretary of the North Cheshire and District Gas Company, is retiring from his present position, by agreement with the Board, on May 31.

Mr. JOHN WILSON, Chief Engineer of the West Riding Group of Gas Companies, has been appointed to the position of Engineer and General Manager to the North Cheshire and District Gas Company to fill the vacancy.

* * *

Mr. J. C. WILLIAMS, Secretary of the Wrexham Gas Company, is retiring this month after 51 years' service. He is to be succeeded by Mr. R. A. JONES, who has been with the Company for 30 years and who has been carrying on the duties during the long illness of Mr. Williams.

* * *

Mr. H. PURSLOVE BARKER, previously Engineering Director, has been appointed Deputy Managing Director of Parkinson & Cowan, Ltd. (Head Office: Terminal House, Grosvenor Gardens, London, S.W. 1), who own and control the Parkinson & Cowan Group of Companies.

Obituary

The death has occurred of Mr. GEORGE BLINCOE, of Ouseburn, Yorkshire, partner in the firm of McLusky & Blincoe, Gas Appliance Specialists, Horsforth, Leeds.

Diary

April 16.—London and Counties Coke Association: Finance Committee, 11 a.m.; Executive Committee, 11.30 a.m.; Central Committee, 1.30 p.m. Gas Industry House.

April 20.—Manchester District Association of Gas Engineers: Visit to Mirfield.

April 21.—Yorkshire Junior Gas Association: Grand Hotel, Sheffield, 2.30 p.m. Paper entitled "Aspects of Post-War Gas Appliances," by Mr. Holloway, Parkinson Stove Company, Ltd.

April 24.—Federation of Gas Employers, Scottish Central Committee: Annual Meeting, North British Station Hotel, Edinburgh, 11.30 a.m.

April 24.—National Gas Council District Executive Board for Scotland: Annual Meeting, North British Station Hotel, Edinburgh, 2.30 p.m.

April 27.—Manchester District Association of Gas Engineers: Annual General Meeting.

May 3.—Southern Association of Gas Engineers and Managers: Grosvenor House, London, 2.30 p.m. Address by A. E. Sylvester.

May 10.—Eastern Counties Gas Engineers' and Managers' Association: Spring Meeting, Grosvenor House, W. 1. Presidential Address of J. Hunter Rioch.

May 14.—Women's Gas Council: Executive Committee, Gas Industry House, 12.45 p.m.

May 23.—B.C.G.A.: Meeting of Members in Scotland: Central Station Hotel, Glasgow, 2.30 p.m.

Scottish Gas Development Centre

The Annual Meeting of the Scottish Gas Development Centre was held in Glasgow on March 21, when Mr. David Fulton, Helensburgh, Chairman of the Advisory Committee, presided over a good attendance of members, who expressed satisfaction with the service rendered by the Centre and the progress made since the inception in 1943. They also expressed appreciation of the work done by Mr. Alex. Bujnowski, M.C., Secretary of the Centre, and his staff.

Mr. Fulton retired from the Chairmanship after a period of two years, and was warmly thanked for his services and his able guidance and leadership during that time.

The Advisory Committee for the year 1945–46 was elected as follows: Messrs. R. D. Keillor, Greenock, Chairman; R. Fife, Kilmarnock; H. S. Milne, Aberdeen; S. Smith, Paisley; F. Mitchell, Lanark County; and H. Bottomley, Caledonian Gas Corporation.

In the Annual Report of the Centre it was stated that the second year of operations had shown a considerable extension of the facilities and services available to members, and some relaxation of the restrictions regarding the manufacture of appliances had resulted in a greater use of gas and the adoption of new applications of gas in industry. The Quarterly Reports of the Industrial Gas Centres, containing descriptions of many new and interesting developments in applications of gas to industry, had been issued to members, and in addition special Papers had been issued.

The infra-red tunnel installed at the Centre, continued the report, had been put to considerable use, and a number of experiments and tests had been made with satisfactory results, and during the year 110 enquiries on various matters were received from members as compared with 65 in the previous year. Some of the larger undertakings had been particularly interested in the use of gas in the baking trade, and several representatives of these undertakings or their consumers had visited gas-fired installations in Glasgow. While the majority of the enquiries initially were for conversions from solid fuel to gas, the consumers had been so favourably impressed with the results obtained from travelling ovens that these were to be installed in many cases.

The Centre has also provided a considerable amount of information in connexion with domestic enquiries.

The Conjoint Conference

The Annual Meeting of the Conjoint Conference of Public Utility Associations was held at Gas Industry House on March 22, the chair being taken by the President, Viscount Falmouth, who moved the adoption of the annual report. In the course of his Address he reviewed the position of the Conference and its work during 1944.

The motion of the President was seconded by Mr. Berry, supported by Colonel Croft, and carried unanimously.

The meeting then proceeded to the election of office bearers for the ensuing year. In proposing that Lord Falmouth be re-elected President of the Conference, Mr. A. E. Sylvester expressed the gratitude of the Conference to him for his services in the past, and for the thoughtful and stimulating Address which he had given.

Having thanked members for re-electing him, Lord Falmouth moved that Sir David Milne-Watson, Lord Pentland, and Sir John Wardlaw-Milne be re-elected Vice-Presidents for the ensuing year, representing gas, electricity, and water respectively.

It was also unanimously resolved, on the motion of the Chairman, that Mr. T. E. Brown, C.B.E., Chairman of the Council of the Public Transport Association and General Manager of the London Passenger Transport Board, be elected as a fourth Vice-President representing the transport interests.

Visit to the Cannon Works

On March 13 the Midlands District Gas Salesmen's Circle visited Cannon Iron Foundries, Ltd., Bilston, to inspect the Cannon post-war cooker. They were welcomed by Mr. A. F. Oatley, Chairman and Joint Managing Director of the firm, who gave a lecture-demonstration of the cooker. The design, construction, and operation were fully covered, and questions were dealt with during the course of the demonstration.

The visitors were entertained at tea, when thanks were expressed to Cannon Iron Foundries, Ltd., and Mr. Oatley, on the proposition of Mr. F. A. C. Pykett, and seconded by Mr. Alfred Hill.

During the afternoon the presentation of a cheque was made to Mr. F. A. Grant, former Honorary Secretary for 12 years, by the Chairman of the Circle, Mr. G. W. F. Cockayne. Mr. Ben Green supported the tribute paid by the Chairman to Mr. Grant's services.

The Second Stevens Memorial Lecture will be given by Mr. W. G. Adam, G.M., at the Institution of Mechanical Engineers, Storey's Gate, S.W. 1, on May 4 at 6.30 p.m. Admission will be by ticket, obtainable from the Secretary, Junior Institution of Engineers (Incorporated), 39, Victoria Street, S.W. 1.

New Self-Service Canteen at Euston

All-gas cooking equipment has been chosen for the up-to-date canteen recently opened by the London, Midland, and Scottish Railway at Euston.

The canteen, which was designed by the Railway Company's Engineers for the use of the Company's employees working in the Euston area, is intended to provide 400 main meals within 2 hours, with a self-service system. The whole of the cooking, hot water, and heating facilities are provided by gas-fired appliances.

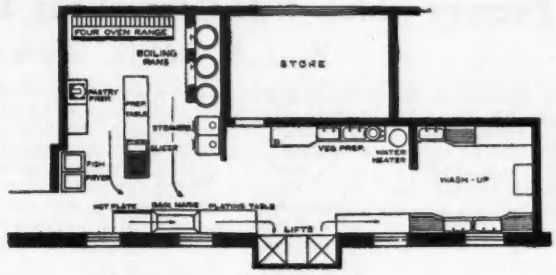
The seating portion and servery are on the first floor and the kitchen is on the top floor. Two lifts are provided for the conveyance of cooked meals down to the servery and dirty crockery up to the wash-up section.

The cooking equipment in the kitchen comprises a four-oven range, a double pan fish fryer, three 20-gallon vegetable boiling pans, and a double-oven steamer. A plating arrangement is situated at one end of the kitchen adjacent to the lifts, consisting of a plating table, bain marie, and boiling table. Ancillary equipment includes pastry mixer with mincing attachment, slicing machine, and potato parer.

Natural ventilation is given by means of canopies and vertical uptakes. Hot water for the washing-up section is provided by means of a storage water heater. The service section is fitted with a 16-ft. hot closet forming part of the counter. A bulk water boiler is installed at one end of the counter, for tea making. The seating section is heated by convector panels.

Our illustrations are of part of the kitchen and the servery, and the line diagram shows the general layout.

The whole of the equipment was supplied and installed by Radiation Ltd., who were the contractors for the complete installation, which included the ventilation, gas and water services, and all cooking and heating apparatus.



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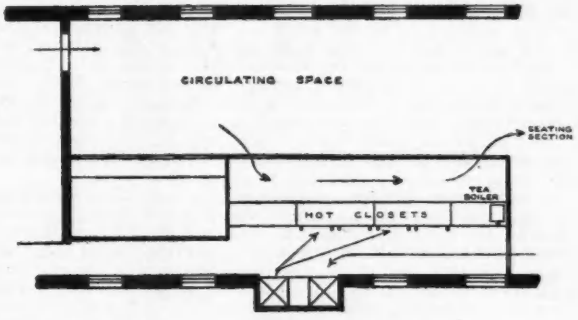

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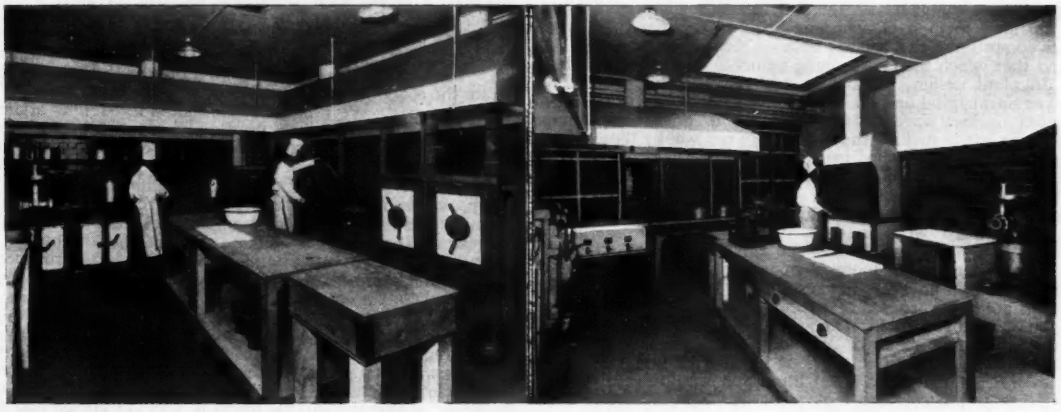


Blackpool's Gas Output

Blackpool's new Gas-Works, planned to meet the peacetime requirements of the town to the end of 1945, have been producing to capacity since 1940, and even so have had to be helped out by putting into operation again the old gas-works which should have been demolished in 1939 under a central area clearance scheme, which, however, was held up by war.

Mr. T. R. Cook (Engineer and Manager) states that during the war years the new works have produced 7,000 million cu.ft. from 420,000 tons of coal. When the works were planned a scheme for 30 years ahead was visualized, and with the present 50 acres there is room for expansion. But Blackpool is to face a new problem in the immediate post-war years, for the Corporation is encouraging many light industries to become established there. Industrial development at the outbreak of war, the increased population through receiving evacuees, and the conversion of many houses into flats, were all unforeseen calls which the Undertaking was called on to meet.

The land for the new works cost £130 an acre, and that adjoining it is now being sold at £250 an acre.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in the "Journal" should not be taken as an indication that they are necessarily available for export.

Gas and Agriculture

A meeting of the St. Helens and District Branch of the National Farmers' Union was held at Radiant House, Cotham Street, by invitation of the St. Helens Corporation Gas Department, on March 23. The members of the Branch were welcomed by Alderman W. Burrows, J.P., Chairman of the Gas and Lighting Committee, and by Mr. R. L. Greaves, Engineer and General Manager of the Gas Department.

A lecture on recent developments in the use of gas and coke in agriculture was given by Mr. Greaves, during which it was recorded that, whereas in 1938 there were only four combined harvesters and grain-drying plants in the country, at the present time there are approximately 3,000. Important progress has also been made with the cutting of grass and grass drying, and in all these developments the Gas Industry has played a major part on the heating application side of the drying processes.

A vote of thanks to the Chairman and members of the Gas Committee and the Gas Engineer was proposed by Mr. H. Abbott, and seconded by Mr. J. Rainford.

At a Meeting of the Lincoln City Council on April 3 it was revealed that on March 19 the Gas Department's coal stocks were equal to only two weeks' supply, and no improvement could be anticipated for some time to come. The Gas Engineer said it was possible the position might get worse, and the question of next winter's supplies was already being viewed with anxiety.

A Necessary Journey*

Factors which will Control the Development of Public Fuel Supply

By J. E. DAVIS, South Metropolitan Gas Company

WHETHER we like travelling or not there is one journey which we can none of us avoid—the journey along the rails of time. This is equally true whether we are thinking of ourselves as individuals or as a group of people bound by a common interest. It is true of our own Industry, which has already made a not inconsiderable journey with a diversion during the last few years over an uncomfortable and unprogressive branch line. We have now good reason to hope that we shall soon rejoin the main line of constructive progress, there to make up much of what has been lost in the last 5½ years.

When our Industry started on its journey the destination was not well defined, but with the passage of time the lettering on the ticket has been deciphered, and to-day we are confident that we are on the road towards perfected public fuel supply. During our journey we have been joined by fellow travellers—the electricity supply industry, the oil and low-temperature carbonization industries, and the coal utilization people, while district heating is, perhaps, waiting on the platform of the next station ahead. The travelling is becoming somewhat crowded, and there are some who are asking rather pointedly whether the continuance of our journey is really necessary. It is the object of this Paper to consider some of the arguments which support a most definite affirmative.

As my argument develops you may consider it strange that a technical man, and more particularly a chemist, should be talking about matters which have an economic significance, but I think you will agree that the usefulness of a chemist in industry is greatly restricted unless he spends some of his time outside the laboratory dealing with the practical applications of his science. When he does so he finds that he, no more than other men, can escape the salutary discipline of economic forces. If he is interested in a new plant or new process or a modified method of working a process, he must take account of the economic factors and justify the new venture in terms of economic success. He soon becomes familiar with the fact that in an imperfect world there is no ideal method of achieving an ideal result. There must always be compromise and balance between that which he would like to do and that which the constraining influence of cost permits him to do. In plant design, thermal or material efficiency has to be balanced against capital and maintenance costs. These in turn must be balanced against wages costs. And, be it noted, the figures which he must use in making the balance are not wholly those ascertained and verified by detailed experience, but are largely estimates based on analogous experience, but modified by the technical modifications which he contemplates.

Technical progress has to-day brought us to the position where we are frequently faced with an embarrassing choice of alternative methods and alternative materials. The public has been told, occasionally at some length, but more often by hints and suggestions, of remarkable technical advances made during the war years, and great expectations are being aroused of sweeping changes arising from the application of improved technical knowledge in providing the essentials of everyday life. One reads of Women's Associations asking that the home of the future shall be provided "with every modern labour-saving device." If that were taken literally it would mean, I fear, that a kitchen would come to look somewhat like the interior of a submarine.

Effectiveness

There must be a sense of proportion in all things, and balance must be maintained between what is technically possible and what is desirable on both technical and economic grounds. In making the choice between alternative technical possibilities, the first consideration is the effectiveness with which the desired task will be done. I have used the word effectiveness rather than efficiency because of its less restricted meaning. One may quite efficiently do the wrong thing, produce the wrong product, or produce it at the wrong time, but an operation which is effective is both efficient and fitted for its purpose.

Effectiveness covers the technical considerations which have to be put into the balance, but the judgment will not be true unless the economic considerations also are given due weight. Two rather different criteria are necessary in considering the economic aspect. There is the usual method of computing the money cost as representing a convenient summation of the human effort expended. But there is the second, even more important, criterion of the call made upon limited resources. Partly because it is more difficult to assess, and partly because it is a matter not brought readily to the attention of the consumer the second criterion often fails to receive the consideration due to it, in spite of the fact that it may be the ultimate limiting factor.

In their recent valuable demonstration at Northolt, the Ministry of Works erected a number of houses, some of which were of conventional construction, using conventional materials, while others made use of different methods and different materials less commonly employed in the construction of dwelling-houses. The carefully compiled records of money costs showed surprisingly small differences, but the value of the unorthodox methods may be great indeed, if the demand for houses at the end of the war is such as to place an impossible strain upon the resources of conventional materials and conventional methods. It may make all the difference between obtaining houses and not obtaining them.

The same need for a balanced choice is found in the selection of fuels for the performance of various functions. The user of fuel has to choose between the alternatives of coal, coke, semi-coke, gas, oil, and electricity, and it is now proposed to add to this list piped supplies of hot water and steam.

From the point of view of effectiveness, with all its many implications in this connexion of availability, convenience and flexibility of control, those supplies obtained by pipe or cable would receive highest commendation. They conform most completely with the desire for "every modern labour-saving device." Moreover, the services supplied in this way carry with them the invaluable adjunct of specialist skill incorporated in the design of appliances, and available as advice on the method of use as part of the consumer service offered by utility undertakings. But we have seen that the balance of choice is not decided by technical considerations alone; there must also be taken into account the demands upon exhaustible resources and the money cost.

Demand upon Resources

Considering first the demand upon resources, we are conscious of the pride that the Gas Industry has taken in the saving of coal made possible by its operation. The saving is substantial, and the arguments demonstrating this saving are well founded, but in view of the importance of this issue the greatest care is advisable whenever the case is stated to avoid over-statement or undue complexity in the method of expression. I do not deny, and if I did the figures would contradict me, that the thermal efficiency of the carbonizing process is in the neighbourhood of 75%. Nor can it be denied that the test bench efficiencies of certain gas appliances are, for example, 45% for a gas fire, 75% for a sink water heater, and so on. But what a muddle arises if we try to use these figures to demonstrate the economy of gas in respect of its demand upon the national coal resources! We find ourselves side-tracked into arguments involving coke and secondary products, comparing operating efficiency with bench efficiency, and involved in other considerations which cloud the simple issue. I suggest that the simple issue is just this: We know from considerable experience under conditions of practical use that the provision of a certain service requires the annual consumption of so many therms of gas. For example, cooking for the normal family represents 80 therms per annum; cooking plus the boiling of small quantities of water on the hotplate represents 100 therms per annum; a wash boiler 15 therms per annum; a complete hot water service 160–200 therms per annum.

By combining such figures with those representing the coal consumed in producing 100 therms of gas, we have a simple method of expressing the coal requirement for any particular service rendered by the agency of gas. I suggest that the most straightforward method of finding such a figure is to consider, as we have been forced to consider in wartime, that the various forms of fuel are pooled and that their value in the pool is proportional to their thermal content. A gas-works takes from this pool 300 therms in the form of one ton of coal and returns to it 150 therms in the form of coke, tar and benzole. The net debit is then 150 therms, or the equivalent of ½ ton of coal, for which 75 therms is supplied to gas consumers. We thus arrive at the convenient and easily explained equivalent of 150 therms of gas for 1 ton of coal expended.

I am aware that this figure really does less than justice to the carbonizing process because of the special values of tar and benzole, and the fact that in many of its applications coke proves more efficient than coal. We can allow for this last fact when we estimate the quantities of coke required for a particular service, and the simplicity of the figure obtained in this way is sufficient justification for refraining from pushing our claims to the uttermost.

It permits us to use the previously quoted annual gas consumption to show that cooking for the normal family by gas represents the expenditure of 0.53 ton of coal annually; that the use of a gas cooker for cooking and boiling water means 0.67 ton; that a wash boiler accounts for 0.1 ton, and full hot water service requires from 1.1 to 1.3 tons. Further, it permits a direct comparison with other agencies. For instance, we may observe from official statistics of the electricity industry that 1,600 Board of Trade units were delivered to the consumer for each ton of coal (300 therms) consumed, and apply this figure to the electricity consumed in providing particular services.

Having made brief reference to the two considerations of effectiveness and demand upon resources, it is appropriate to give consideration to those factors which can be summarized in terms of money cost. Seeing, however, that the obtaining of exact costs is the province of the accountant rather than the technical man, I propose to consider

* Paper to the Southern Association of Gas Engineers and Managers (Eastern District).

mainly the manner in which costs are likely to be influenced by technical factors. Such figures as I may use are for the purpose of giving relative importance to the various factors and their interplay, and should not be accepted as precise estimates or fully verified results.

Costs and Prices

It is necessary to point out that the cost of the service may not be, and often is not, the same thing as the price. The cost of supplying gas for cooking may not be the same as that of supplying gas for space heating, but the price charged usually is the same. The cost of supplying electricity for lighting may be different from the cost of supplying electricity for cooking, though the prices charged may not, and usually do not, reflect the cost of supply, but rather the competitive conditions of sale.

To comprehend the significance of fuel costs it is necessary to recognize that the cost of those fuels which are produced centrally and passed through a distribution system to the user arises from a variety of acts, many of which are not functionally related to the quantity of fuel used. For some years it has been recognized that it makes for a clearer understanding if there can be a separation of those items of cost which are usually related to the number of customers, those which are mainly related to the size and nature of the demand, and those which are related to the quantity of the commodity used. The division is in some measure arbitrary, and any particular allocation under these three heads is open to criticism and debate. When such a classification is made it is seen how substantial a proportion of the total costs can be placed under the heading of customer charges. Particularly is this so in the case of gas supply as at present developed, where most of the business consists in the supply of relatively small quantities of fuel to a large number of users. The question that arises is whether the incidence of these charges could not be lessened by spreading them over larger quantities per consumer, so reducing the total cost per therm of gas supplied. It is, of course, possible that by so doing the charges governed by the size and nature of the demand might be increased. Thus it is of the greatest importance to future development, first, that the magnitude of the charges under these three headings should be known with reasonable exactitude and, second, that there should be a fair picture of their probable changes with future development.

Unfortunately, complete and accepted information on these points is difficult to obtain, and the most that I can put before you consists of estimates, based on such records as are available, but needing verification. My object in presenting them is to demonstrate their extreme importance, and to stimulate enquiries which will produce more exact figures that can be used with confidence. A high degree of precision in these matters can probably never be obtained, nor, indeed, is it necessary. Minor errors in prediction will be no greater than the inevitable fluctuations in operation, but without data backed by sufficient evidence programmes of development cannot be planned, nor can our Industry demonstrate the magnitude of its economic importance.

Demand Characteristics

There is so much flexibility in gas manufacture, storage, and distribution that our Industry has not given anything like the close attention to demand characteristics that the electricity industry, with its much less flexible system, has been forced to give. I believe that in the future it will be necessary to know much more closely the effect of demand characteristics upon costs, and I am therefore asking your patience while I refer to certain terms which have been used to describe these characteristics.

The first term to which I would refer is "connected demand." A gas cooker with all burners in full operation might represent a consumption rate of 60,000 B.Th.U. per hour, and a consumer with this appliance would be said to represent a connected demand of 0.6 therm. A wash boiler would represent perhaps 0.15 therm, and a gas fire another 0.15 therm. Thus, the connected demand of a consumer with these three appliances would be 0.9 therm.

It is conceivable, though very unlikely, that all these three appliances might be turned full on simultaneously and result in a maximum instantaneous demand equal to the connected demand, but even were this done the demand could not continue for very long. The oven thermostat would soon come into operation. The vessels on the hotplate would come to the boil, and the rate of demand would fall, so that taken over a period of appreciable duration, such as one hour, the demand must be less than the full connected demand.

So far I have been speaking of a single consumer, and these considerations of maximum demand affect the size of his service pipe and meter. The maximum demand of a single consumer is, however, a poor guide to the provision that the undertaking must make in the form of distributing mains and manufacturing plant for a number of consumers. To obtain guidance on these points regard must be paid to the variation, or diversity, in use as between one consumer and another.

Illustrating the point we may consider three similar families living next door to one another, each using a gas cooker. It is Sunday morning, and family No. 1 is about to prepare Sunday dinner. They are proposing to cook a leg of pork and dinner is to be at 1 o'clock. The oven will be lit somewhere about 11 o'clock; by 11.15 the thermostat will have cut down the gas rate of this oven to the maintenance rate. Some time after 12 o'clock the cooking of vegetables, preparation of sauces and so on will create a substantial demand for gas on the hotplate.

The second family has decided to have a grill and their demand may show a higher peak, but will not commence until some time after 12 o'clock.

The third family is going out to lunch, and will probably boil a kettle for a hot drink about 11 o'clock and show no demand thereafter.

This is the sort of thing that is meant by diversity in demand in so far as one particular load is concerned. It has the very important result that if we consider a number of consumers—say 1,000—their maximum demand after taking account of diversity is appreciably less than 1,000 times the maximum demand of any single consumer.

It is this maximum demand to which the term "after diversity maximum demand" has been applied. It determines the carrying capacity of the distribution system.

The size of the maximum hourly demand has little direct effect in deciding the capacity of the manufacturing plant, because of the interposition of storage holders. The capacity of manufacturing plant is decided by the maximum daily demand. Here also diversity between consumers has some effect in reducing the total demand below that represented by a simple addition of the maxima of all individual users, though the effect is smaller than in the case of the hourly demand.

It is obvious that a knowledge of the magnitude of these demand figures for various services is a most important guide to predicting the cost of supplying the services. The only service for which the demand characteristics can be measured from existing records is the cooking load, and I have attempted to do this for my own Company's area of supply by taking the hourly figures for gas sent out on the four Sundays of greatest demand during two pre-war years.

There were known to be 400,000 cooking stoves connected to the mains, and at 1 p.m. on Sundays, when there would have been little demand for other purposes than cooking, the output reached on many days a figure of 30,000 to 34,000 therms, with a maximum of 35,000 therms. This represents an after diversity maximum hourly demand of 0.09 therm per cooker. The after diversity maximum daily demand was estimated by observing for these same Sundays the amount of gas sent out between the hours of 9 a.m. and 5 p.m. in excess of the quantity that would have been sent out if the rate of demand had remained as it was between midnight and 8 a.m. This method gave an after diversity maximum daily demand of 0.4 therm per cooker.

There is a third important figure in demand characteristics—the annual consumption. Its importance arises from the fact that the revenue necessary to provide plant and organization to meet the demand characteristics has to be provided by charges made on this particular number of therms. If the number of therms is high and the demand charges low, the service is a cheap one to supply. If the demand charges are high and the consumption low it will prove a costly service. In the case of the gas cooker the normal annual consumption is well established at about 100 therms.

Load Factor

These three figures of maximum hourly demand, maximum daily demand, and annual consumption permit us, if we wish, to speak of the load factor. This may be expressed on either a daily basis or an hourly basis—that is, regarding the average day or the average hour as a percentage of the maximum day or the maximum hour. Using the characteristics determined for the cooking load, the daily load factor works out at 68.5% and the hourly load factor at 12.5%.

Now these figures for demand characteristics of the cooking load have the backing of experience, but we cannot obtain the same backing when we wish to estimate the demand characteristics for other domestic loads, such as water heating and space heating. Yet, although the margin of error may be greater, it is worth making the attempt.

An instantaneous water-heating installation represents a connected demand of 1 therm, a storage system of 0.3 therm. Diversity in use of an instantaneous system is likely to be high. A reasonable estimate of the after diversity hourly demand may be made on the assumption that each instantaneous heater is used every day to obtain one bath at some time between the hours of 6 a.m. to 9 a.m. or 6 p.m. to 9 p.m. The storage type of heater would give a somewhat lower hourly demand because the thermostat is in operation throughout the 16 hours of the waking day. The daily demand of the two systems would be the same for the same degree of use, and is obtained by the assumption that the maximum day's use is 1½ times the average daily use.

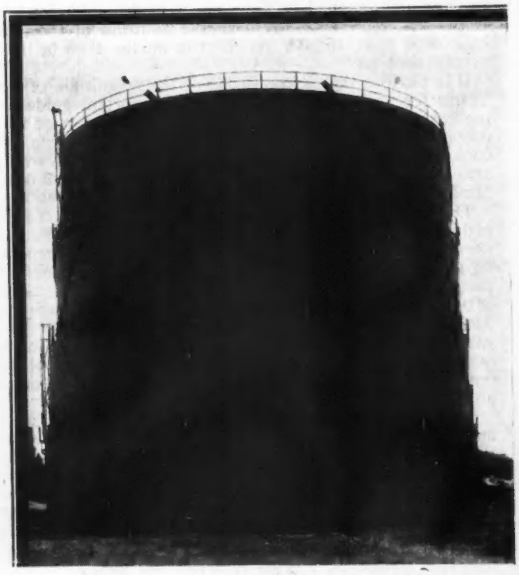
Space heating characteristics may be computed by the assumption of certain temperature standards, and the application of those standards to a schedule of day-to-day temperature variations throughout the year. The temperature variations which I have used are those for London over the 5 years 1938–42 inclusive. This period included two exceptionally severe winters, but even so it is of interest to note that there were on the average only 4½ days in the year when the outside temperature remained below 30°F. and the maximum heating demand would have been experienced.

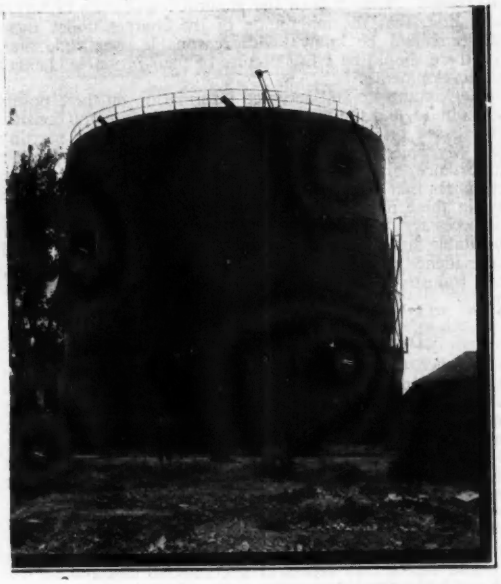
The heating standard assumes that a minimum background temperature of 50°F. is maintained throughout the house, and that gas is used to provide the requisite amount of heat with a thermal efficiency

ADDITIONAL STORAGE CAPACITY

may *not* necessarily involve additional ground space.

If faced with this problem have you examined the possibilities of increasing your Holder capacity within the original tanks?





These Gasholders, with capacities of 336,217 and 147,100 cu. ft., replace two single-lift Holders of 95,000 and 50,000 cu. ft. respectively. Thus, the total storage capacity of these two units has been more than tripled without additional ground space, and utilising the existing tanks.

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of 80%. Occupied rooms must be topped up to an equivalent temperature of 62°–66°F. during the period of occupation. The assumptions are that occupancy extends over 16 hours of the day and that half the house is occupied in the sense of requiring this additional heating. The topping up is effected by means of convector gas fires with a thermal efficiency of 60%.

The results of these computations are given in Table I. Their accuracy depends upon the reasonableness of the assumptions made. I have given you these assumptions, and I must leave you to judge for yourselves as to their reasonableness.

The Table includes items E and F, identified as supplementary heating (by this I mean the bedroom gas fire and hall heating loads, which is often the most that we attempt in the way of space heating by gas) and living room heating, which implies heating the most used room of the house by a convector gas fire when the house as a whole is not provided with background heating.

Certain combinations of the various functions are also shown, and it will be noted that the characteristics are not entirely simple additions of the components. For example, it would be wrong in considering the hourly demand to add together the separate demands for cooking and water heating, because only to a slight degree are these coincident.

TABLE I.—Estimated Demand Characteristics of Domestic Load by Gas.

	Connected demand.	After diversity maximum demand. Hourly.	Daily.	Load factor. Hourly.	Daily.	Annual consumption.
	Therms.	Therms.	Therms.	%.	%.	Therms.
A. Cooking	0.6	0.09	0.4	12.6	68.5	100
B. Water heating—Instantaneous	1.0	0.05	0.8	47.0	68.5	200
Storage	0.3	0.04	0.8	57.0	68.5	200
C. Background space heating	0.15	0.09	2.25	15.0	15.0	125
D. Topping-up space heating	0.24	0.05	0.8	30.0	45.0	130
E. Supplementary heating	0.25	0.12	0.9	3.0	9.0	30
F. Living room heating	0.25	0.10	1.6	21.0	31.0	180
A + B	1.6	0.10	1.2	34.0	68.5	300
A + B + C	1.75	0.19	3.45	25.0	34.0	425
A + B + C + D	1.99	0.24	4.25	26.0	36.0	555
A + B + D	1.84	0.15	2.0	33.0	59.0	430
A + D + B (summer)	1.84	0.14	1.2	27.0	75.0	330

Coincident and Non-Coincident Demand

This factor of coincidence or non-coincidence of demand is of considerable significance, greater in the case of the electricity industry than the Gas Industry, but still important to us. It raises the question, as between two non-coincident demands, which should be held responsible for the payment of the demand costs. We might, for instance, argue that since the greatest daily demand for gas is the Sunday cooking load, this load should bear the whole of the costs for providing the requisite manufacturing plant, storage, and distribution. It would follow that if an industrial undertaking which does not work on Sundays wished to take a supply of gas, it could have this supply at a price which did not include the overhead demand costs. Such an argument would, of course, give a very low figure for the price of gas to the industrial consumer, but I suggest it would be a dangerous offer to make, because so low a price would almost certainly lead to requests for a similar quotation to other industrial consumers, and these could not be met at the same price. A more balanced view would suggest that each of the non-coincident demands should be charged at a price which includes full provision for meeting its particular demand characteristics, and that the benefits arising from non-coincidence should be shared *pro rata* between them. Where the benefit arises from non-coincidence of two demands made by the same consumer or group of consumers, he or they are clearly entitled to the benefit, but it would appear both unjust and obstructive to balanced development for an undue proportion of the benefit to be given to a selected group or groups of consumers.

You may or may not agree with the assumptions that I have made in attempting to derive some figures for demand characteristics, and I am risking further your disapproval in putting forward some suggestions for the classification of costs of gas and electricity supply. The total figures can, of course, be derived fairly easily from published accounts, but their classification is a much more arguable matter, and I should like to explain some of the assumptions made on the more controversial points.

A Comparison

Capital costs of plant and distribution systems for both industries are based on new constructions completed during the period between the two great wars. It is recognized, particularly in the Gas Industry, that a proportion of such capital assets was purchased at lower price levels, but it would be misleading to take this into account in making a comparison intended to be a guide for future development. For both systems the same rate of interest on capital—namely, 5%—has been taken. On manufacturing plant 8% per annum has been allowed for repairs, maintenance, and depreciation, and 5% for these three items in respect of the distribution and storage system. In the case of gas supply, a figure has been shown for commercial expenses to cover such items as salaries and wages of sales and service staff, collection and the deficit on meters, stoves, and automatic supplies. The figure taken is appreciably higher than the actual pre-war experience, but it is appropriate to do so since it is recognized that more expenditure in this direction will become necessary in the future. In the case of electricity supply the item of commercial expenses is included under management and general.

From the figures given for the demand characteristics of domestic heat supply, it can be seen that the maximum possible extension in the use of gas by this class of consumer would not increase the hourly demand to more than three times its present value. This being the case, the growing hourly demand could be accommodated by an increased pressure drop in the local mains and local trunk mains, provided that every consumer was supplied through a service governor. There would appear to be no need, in most cases, to relay these mains, and as the cost of the local mains and services represents some 90% of the expenditure on the distribution system, it is fair to regard the annual charge on these items as a customer charge. Transmission capital is, however, likely to increase with increasing demand. A similar consideration applies to part of the expenditure on the electrical distribution system, but only to about a quarter of the total, for in the electrical system there is usually a smaller margin for increased capacity without adding new cables or transformers.

The suggested classification of costs for gas supply is shown in Table II, and that for electricity supply in Table III.

TABLE II.—Classification of Costs of Gas Supply.

(1938 Price levels.)

Item.	Customer. £ per consumer per annum.	Demand. £ per annum per therm max. 24 hour demand.	Commodity. Pence per therm.
Net coal	...	...	1.30
Manufacture salaries	...	0.16	...
Manufacture wages	...	0.14	0.30
Maintenance of works—general	...	0.16	0.16
Repairs and renewals of manufacturing plant	...	0.64	...
Interest on manufacturing capital	...	0.60	...
Interest, repairs and renewals on storage and transmission capital	...	0.32	...
Gas pumping	...	...	0.20
Repairs and renewals of distribution plant	0.50	...	...
Interest on distribution capital	0.50	...	...
Commercial expenses	1.00	...	...
Management and general	0.20	0.08	0.13
Rates	0.25	0.10	0.15
	2.45	2.20	2.24

TABLE III.—Classification of Costs of Electricity Supply.

(1938 Price levels.)

Item.	Customer. £ per consumer per annum.	Demand. £ per annum per unit of maximum demand. kWh.	Therm.	Commodity. Pence per kWh.	Therm.
Coal	...	...	...	0.16	4.80
Manufacture: salaries and wages	...	0.25	7.5	0.01	0.30
R. and M. and interest on capital of manufacturing plant	...	2.28	68.4	...	...
R. and M. and interest on capital of distribution plant	1.00	3.00	90.0	...	...
Loss in transmission	...	...	...	0.02	0.60
Management and general	0.75	0.38	11.4	0.03	0.90
Rates	0.50	0.25	7.5	0.02	0.60
	2.25	6.16	184.8	0.24	7.20

TABLE IV.—Estimated Costs of Domestic Heat Services.

(1938 Price levels.)

	Gas. Pence per therm.	Annual cost.	Electricity. Pence per kWh.	Annual cost.
A. Cooking	10.2*	85/-	1.57	260/-
B. Water heating	4.4	73/-	0.54	180/-
C. Background space heating	11.7	122/-	1.30	270/-
D. Topping-up space heating	5.5	60/-	0.81	180/-
E. Supplementary heating	18.0	45/-	6.15	300/-
F. Living room heating	6.9	104/-	1.06	320/-
A + B	6.3	158/-	0.73	365/-
A + B + C	7.9	280/-	0.90	640/-
A + B + C + D	7.3	340/-	0.88	815/-
A + B + D	6.1	218/-	0.76	545/-
A + D + B (summer)	5.9	164/-	0.87	480/-

* Carries the whole of the customer charge.

The purpose in mind in preparing these figures has been to show how, when they are combined with the demand characteristics, they may be used to indicate the cost of supplying domestic heat services by alternative agencies. The result of this combination is seen in the figures shown in Table IV. In the case of electricity the customer charge is not included because it is felt that this can and will be carried by the supply for lighting and power, and would not be recovered in the charge for heating purposes. In the case of gas the customer charge is assumed to be recovered wholly on the cooking load.

The first fact demonstrated by Table IV is the high cost of meeting, by either gas or electricity, those space-heating demands which arise only during the coldest period of the year—background

space heating and supplementary heating. The figures justify the policy of the Gas Industry in advocating the use of coke for meeting these demands in order to give the cheapest possible form of domestic heat service with the maximum amenities in the way of convenience and cleanliness. But it is interesting to note from the estimates for combined services that, even taking the adverse demand characteristics into account, a complete gas service is not unreasonably costly. It may mean that a consumer has to pay perhaps £5 or £6 a year more for a completely automatic service than he would for one which retains small quantities of solid fuel for use in the winter. Many may wish to do this, and I believe it is our duty as a public utility to prepare to meet such a demand as and when it arises. Indeed, it is questionable whether the use of gas or electricity for such purposes as supplementary heating can be avoided. When a really cold spell comes people will leave the gas oven on, put an electric fire near the cold water tank in the loft, and use gas radiators for 24 hours a day. We shall obtain the peak load whether we wish it or not. It may well prove the wisest course to accept the inevitable peak, but to obtain, in compensation, the higher annual consumption which would make the peak less onerous economically.

In making comparison between the estimates of cost for gas and electricity it is well to bear in mind that two-thirds of the total electricity supply is to industry, and that there may well be a benefit arising from non-coincidence of demand in which the domestic consumer is entitled to share. Such a benefit would lead to a reduction in electricity cost below the figures shown, but I believe it to be improbable that such a benefit could ever reduce the cost of an all-electric service to less than twice that of the equivalent gas service—a ratio which, incidentally, reflects the ratio of coal consumed.

Now I do realize that I may be considered to lack caution in putting forward figures of the kind I have submitted to you, with so little confirmatory and accepted evidence. However, someone must make a start, and I would ask you not to regard these figures as the answer, but rather as a challenge calling for contradiction or confirmation. In that way we may discover the truth, and be better able to develop the important business of public fuel supply on scientific lines.

DISCUSSION

Mr. **D. Cleave Cross** (Lea Bridge) said he could not reconcile Mr. Davis's statement on the question of equivalent coal for cooking. He gathered that a ton of coal represented 300 therms; 150 therms were returned to the pool in the form of coke, tar, and benzole, and 75 were supplied as gas. If cooking took approximately 80 therms a year, how could that be equal to half a ton of coal, when they got only 75 therms out of a ton?

Mr. **Davis** explained that of the 300 therms in every ton of coal 150 were taken out in the gas-making process, and returned to what he had called the fuel pool as coke, tar, and benzole. The other 150 remained on the works, and from the 150, 75 therms were sent out as gas, and 75 were used for waste heat, steam, &c. For every 300 therms (300 therms = one ton of coal) left on the works, 150 were sent out to the district; that being so, if one used 75 therms for cooking, the consumption would represent half-ton of coal.

Mr. **G. L. Braidwood** (Gas Light and Coke) said Mr. Davis had brought forward points of very great importance to the Industry. The main comment he wished to make applied to the space-heating load. The Author, in one of his assumptions, gave the minimum background heating, by gas, to raise the temperature of the household in general to 50°F. He (the speaker) suspected that it was only a small minority of houses that had background flueless heaters, and although one might suppose they were on in very cold weather, he doubted whether they were employed to bring the average temperature up to 50°F. when the outside temperature was not exceptionally cold. Next the Author assumed that topping-up heating was that which was required to bring the occupied half of a house up to 62°–65°F. He himself would be inclined to suggest that the assumption that half an average house was occupied for 16 hours of the day was rather high. In this country there were a large number of days in the year which were not very cold and therefore did not call for a full fire, but on which some heating was required, and that surely was the type of heating which could be supplied by what they called background heating—a form of heating he disliked because it did not provide ventilation. If the Gas Industry was going to supply background heating it should provide some form of flue or ventilation in order to avoid excess humidity, and if they did that the amount of heat given by the flueless heater would be insufficient. Turning to the Author's estimated demand characteristics, he was at a loss to understand how the background space-heating figures could apply to flueless heaters. If this form of heating was used only on exceptionally cold days he failed to see how the hourly load factor could reach 15%. On the other hand, for the heating of a living room, he would have thought the fires would have been alight for a sufficient number of days to give a better factor than 15%. Mr. Davis had demonstrated the high cost of meeting, by either gas or electricity, the space-heating demands which arose only during the coldest period of the year, and he agreed with him in advocating the use of coke for meeting these demands. At the same time it seemed to him that the convection type of heating called for much research.

Mr. **Davis,** in reply, agreed that the standard of heating in the case of background heating was rather artificial, and thought as an alternative one might take the maintenance of a temperature of 7°–10°F. above the outside temperature during the winter months. With the kind of equipment many people had to-day he did not think they would put on a background heater; they would prefer the radiant fire, and that was by no means a short period load. In his own house he frequently had the fire on in June, and in fact there were only about two months in the year when the fire was not used. If the radiant heat from a gas, coke, or electric fire was going to be used for topping up there was a need for background heating. That could be done by gas, but it was that load, if it was going to maintain a temperature of 50°F. inside when the outside temperature was 30°F., that would synchronize with a tremendous peak. That was why he suggested that if one was working for the cheapest possible combination of fuels one should use gas for the topping up heating, and coke for winter water heating combined with background heating (using a coke boiler for hot water supplies, with one or two radiators or coils in appropriate places). For topping up he favoured the convector gas fire. He agreed that there was a great deal more work to be done on research in finding out precisely what were the heat needs in a home, and which were the best ways of designing appliances to meet them.

Mr. **R. F. Twist** (South Metropolitan) hoped Mr. Davis would go much further, and show them the means of getting accurate information on some of the points on which information was now very scarce. He supposed it could be done by enlisting the help of a number of people who were interested in the Industry. They might fix up five or six meters in each of their houses, equipped with clocks and recorders which would automatically show over a period of a week, a month, or a year, just how much gas was used. Even then it might be difficult to achieve the right conditions to make sure that the information they got was really the information they wanted. The tables given in the Paper left him with the impression that the cost of doing anything by electricity was a good deal greater than the cost of doing it by gas. Many people did not seem to think so, and people would take on an all-electric house under the impression that it was not going to cost them any more than gas and electricity, or gas alone.

Mr. **Davis** agreed that it was not easy to gather information, and he appealed to everyone to see whether they could in their own spheres find some means of getting information and examples. There was a tremendous variation between individual people and in their use of appliances, even where the same number of people lived in the same kind of house. One of his colleagues had been kind enough to take a lot of meter readings in his own house. He heated his living room by gas and had bedroom fires and gas radiators. Whereas the computed theoretical maximum daily demand was 4.25, his figure, excluding the refrigerator, was 4.5 therms. As to the comparative costs of gas and electricity, about two-thirds of the total output of the electricity industry went to industry and one-third to the domestic consumer. About half of that—a sixth of the total—was used for lighting, and the rest for heating, cooking, &c. He estimated that a fair price for electricity for domestic heating purposes would approach a penny a unit. If electricity developed to the extent not only of one-sixth, but of one-third and one-half, then one of these days somebody was going to have to foot the bill.

Lt.-Col. **F. J. Bywater** (South Metropolitan) said that seven years ago they put up a tariff which did not take serious account of the domestic factors to which Mr. Davis had called attention. It dealt chiefly with the subdivision of the costs between commodity, overhead, and consumer charge. In contemplating the displacement of solid fuel by gas they postulated that 100 to 120 therms of gas would be required for one ton of coal. Although his Company had suffered probably more damage than any other in the country through the war and the average consumption per ordinary consumer had fallen to 116 therms, the average consumption per tariff consumer was 335 therms. Mr. Davis had referred to the diversity factor in dealing with the gas load, and in his opinion that and the consumption per consumer were a problem they had to face. Regarding diversity factor, he suggested that Mr. Davis might have used the expression "second diversity" rather than "after diversity." If the Gas Industry directed its attention to improving the consumption per consumer and achieving as much diversity as possible in its loads—and he did not overlook in that connexion the importance of the industrial load—then the impact of winter peak loads, which so many people feared, would have less significance.

Mr. **Davis,** in reply, agreed that the term "after diversity" was not ideal. The Electrical Research Association regarded this matter of the loading of their plant, both manufacturing and distribution, and the costing and consequences of such loading, as a research matter.

Mr. **W. H. Bennett** said the question had been raised as to what was efficiency in the mind of the public. If they were going to think strictly in terms of efficiency of production and utilization they would not sell gas or gas fires at all, because the gas fire was not so cheap as the coal fire. They had to be very careful when talking about efficiency. No one would be able to sell electricity on that basis because it was not so efficient as coal from the cost point of view. He agreed with Colonel Bywater that they wanted to get a diversified demand, but after all they were in the hands of the public, and the public would demand a fire whenever they liked.

Mr. **Davis** said he had purposely used the word "effectiveness" rather than efficiency. It was the effectiveness with which the gas fire or heater did its job that mattered. When they came to the question of overall efficiency he thought the line taken by the Domestic Heat

They have had to make do for a long time now but, grown wise in that experience, they will re-shape their home with assurance and discrimination.
Coming to the kitchen they will seek the most efficient cooker, a quest in which Parkinson will endeavour to play their part.

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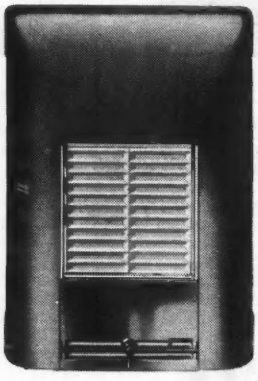
as important as any of the advantages offered in the SILENT BEAM *gas fire....*

THE penetrancy value of the heat emitted by the domestic gas fire has been consistently advanced over the years as a result of Radiation research. In the Silent Beam fire it has reached a stage that will provide for the Industry another valuable asset in the post-war years.

In the endeavour to secure visual evidence of the progress made, the photographs opposite have been taken, through infra-red filters, of objects exposed solely to radiation from (1) a High Beam fire and (2) a Silent Beam fire—both standard models—under similar conditions. The photographs are untouched.

Comparative tests show an increase in penetrancy of no less than 20% over a fire of the High Beam type.

The **SILENT BEAM** *Gas Fire*



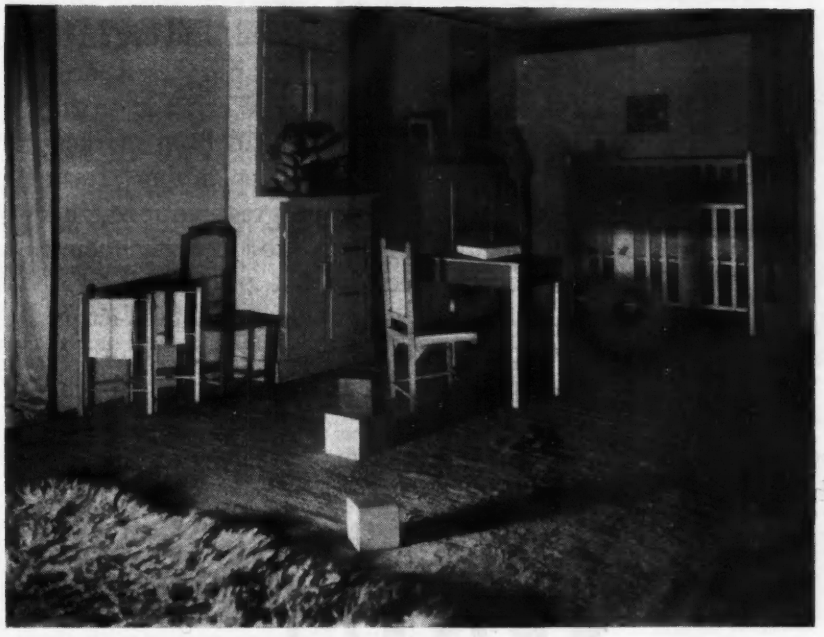
The adoption of luminous flame burners in the Silent Beam fire gives—

(*a*) Quite silent operation.

(*b*) Immunity from lighting back

(*c*) —and from choking of jets by dust, etc.

(*d*) Less need for maintenance attention.



(*Upper illustration*) Direct photograph of a children's nursery set-up in the path of the radiation emitted by a Standard High Beam Gas fire running at normal adjustment and gas rate (15,750 B.Th.U./hr.)

(*Lower illustration*) Direct photograph taken under exactly the same conditions, but the gas fire used in this case was a standard model Silent Beam, also running at normal gas rate (15,000 B.Th.U./hr.)

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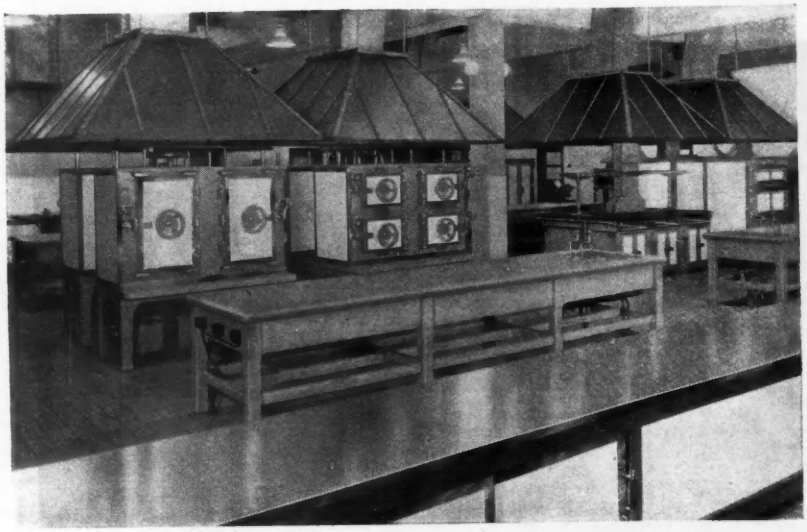

ON TO RECONSTRUCTION

Long before the war clouds had begun to gather we were noted for progressiveness in gas-stove design . . . When the storm broke over Europe we had been marketing new models and planning fresh developments. All progress stopped, and the Nation's plans to defeat enemy aggression became first priority.

. . . To-day, as we move on to Victory and peace, we are preparing to return to the service of Gas, and to apply to the many problems of the Reconstruction period the same vigour, determination and enthusiasm that are bringing us through the war effort.

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Services Committee was the proper one. They had faced up to the problem of the muddle and confusion that existed in pre-war days in domestic fuel utilization, and had demonstrated that if they were given the house and an idea of the habits and requirements of the people who were to occupy it, they could provide a range of services to suit all the normal requirements of the tenants. They worked out the initial costs of appliances and equipment, and calculated the running costs that might be expected with normal usage. Gas and coke was the cheapest combination, but if they could get gas on a suitable two-part tariff it would cost very little more than gas and coke. It had been calculated that an all-smokeless fuel service could be provided at a cost of the products of 3½–4 tons of coal per annum, as against 5–6 tons before the war, and that was a matter of considerable national importance.

Dr. **E. V. Evans** proposed a vote of thanks to the Author, and speaking of more than 20 years' association with him, he said he knew of no other young chemist in the country who had a deeper and sounder basic knowledge of his subjects.

Mr. **W. H. Bennett** seconded the vote of thanks, and Mr. **Davis** replied.

Primitiva Gas Company

The Directors of the Primitiva Gas Company of Buenos Aires have issued to shareholders a statement on the expropriation proceedings, in which they report that the Company's assets and plant were taken over by the Argentine Government Petroleum Department (known as Y.P.F.) on Mar. 5, and the Company's profit-earning existence has therefore come to an end. It now remains for the final amount of compensation to be determined by the Argentine Courts under the Expropriation Law. The original expropriation decree was issued on April 13, 1944, and on April 20 the Company's representative in Buenos Aires received assurances that procedure under the existing law had been decided on in order that impartial judges should determine the value of the assets to be taken over. Under the Expropriation Law then in force, this value had to be determined by the Court after hearing the evidence of experts appointed to represent both parties. On July 6, 1944, however, the Argentine Expropriation Law was altered by a Decree which dispensed with the appointment of joint experts and substituted what appears to be a less satisfactory procedure.

The Company's legal representatives have never ceased to maintain that the valuations, on which the Government have based even the increased deposit which they have made, are still far below actual values; that apart from the equitable treatment which they have a right to expect, Argentine Law does not permit the suppression of a legal business; that the Company's plant has continued to render efficient service even under war conditions and is in fact being used by the Argentine authorities, and that for any and all of these reasons the alleged cost of removing the mains should not be deducted from the valuation; these and other considerations will be pressed by the Company's representatives before the appropriate judicial authorities.

On Feb. 27, 1945, an entirely unexpected development occurred when the Municipality of the City of Buenos Aires advanced a claim against the Company for nearly 27 million pesos (say, £1,650,000) in respect of profits in excess of those allowed under the Company's Municipal contract, and obtained a preventive embargo on the deposit made in its favour by the Government in the Court charged with the expropriation proceedings. This claim is alleged to be based on the Company's contract with the Municipality which ran for twenty years from Jan., 1920, to Jan., 1940, and which has been extended for various periods since that date. This contract provides that the Municipality and the Company shall mutually agree the amount of capital invested in the business, and that on the sum so fixed any profits in excess of 8% per annum shall be refunded to the Municipality. The Company has always been ready to co-operate in fixing the amount of the capital in accord with the Municipality, as provided in the contract, but as for a long time the municipal officers have carried on without allowing the Company to collaborate, it is obvious that the claim is not based on capital figures settled in mutual agreement. There had been no time yet to obtain details of the calculations upon which this latest claim is based, but apart from any question of prescription, the Company will naturally contest any claim based on a unilateral calculation of this nature.

The Board emphasize that it is in the hearing of its claim, under the Expropriation Law, before the Argentine Courts, that opportunity will at last occur to demonstrate in detail the justice of the contentions hitherto advanced in general terms as to the real value of the Company's assets as a going concern; and they are still confident that when their case is examined exhaustively by an impartial tribunal, the inadequacy of the values hitherto put forward by the Government will become apparent. The life of the Company as an operating concern having come to an end, most of the subordinate Staff in Buenos Aires have been taken over by the Y.P.F.; most of the seniors have promised to remain so long as their services are required in connexion with lawsuits and valuations, and the Board are treating these officers with the consideration which they are confident the shareholders would wish to extend to men who have rendered such efficient and loyal service, particularly under the peculiarly trying conditions of recent years.

COMPANY MEETING

Wellington (Salop) Gas Company

At the Annual Meeting of the Wellington (Salop) Gas Company on March 26, the CHAIRMAN, Major Julian Day, said: On this occasion, for the first time since the annual meeting in March, 1940, it is permitted to publish the financial Accounts in the normal pre-war manner. It is now possible for me to disclose the very exceptional growth in the sales of gas during the last four years. The year 1944 closed with a record output, the sales of gas amounting to 436 million cu.ft., or 1,962,796 therms, an increase of no less than 82% when compared with the sale of gas in 1938.

With an attractive schedule of prices for industrial purposes operating over the period 1939/44, it was anticipated that this load would expand. The expectation was fully realized, the sale to industrial consumers in the area in 1944 being 102% over the 1938 figure.

Revenue from sales under the Company's other tariffs—commercial, two-part, ordinary domestic, and prepayment—has shown increases year by year over the same period, bringing the total revenue in 1944 from the sale of gas alone to the figure of £72,628, which, taking into consideration the different prices in operation for various uses, represents a satisfactory and well-balanced revenue figure averaging 8.9d. per therm sold.

These tariffs, based on a published price of 10.6d. per therm, were framed 14 years ago with the object of meeting what was believed to be the needs of various classes of users. The tariffs were very well received, and have contributed in no small measure to the continued success of the Company.

During the past four years the price of coal has increased substantially and costs of labour and materials have risen proportionately. The fact that the Company has not found it necessary to raise the published price of 10.6d. per therm during that period is proof of the exceptionally able management of the Company's affairs for many years by Mr. H. J. Woodfine, and of the service the Company has rendered to its consumers. I should emphasize that the Company manufactures its entire output, and does not obtain bulk supply from coke ovens or other sources.

A matter closely affecting the prosperity of the Gas Industry is that of integration and, as Wellington has played a prominent part in linking up with smaller undertakings operating in its neighbourhood, thus benefiting the consumers and adding stability to the Company itself, some reference to the Company's achievement in past years should be made.

In 1920 the Wellington Board of Directors opened negotiations with some half dozen small undertakings with the object of forming one medium-sized Company. Eventually, in 1922, agreement was reached for the absorption of one Company, and in 1930 a second success was achieved. At the time of the merger each of these Companies had an output of 15 to 16 million cu.ft. per annum. At the close of 1944 the sale of gas in one of these two areas was 86 millions, and in the other 117 millions.

In 1936 the Severn Valley Gas Corporation acquired a controlling interest in the Wellington Gas Company, and, as its policy of integration is identical with that pursued by this Company, further steps were taken to increase the area of supply. A small privately owned company was acquired in 1939, at which time its sales slightly exceeded 2 million cu.ft. per annum. In the year 1944 the quantity of gas sold was 40 millions, embracing industrial, commercial, and domestic loads in the proportions of 21%, 18%, and 61% of the total output. I should state that the prices and tariffs ruling in the Wellington inner area are applicable to each and every user in the outer areas.

For some years now the Company has supplied in bulk for the Ironbridge Gas Company, another member of the Severn Valley Group of Companies, the whole of the gas required for that Company's Dawley area, amounting to some 35 million cu.ft. in 1944, and, in addition, while repairs and renewals have been carried out, a temporary supply has been given to the Madeley area of the Ironbridge Company.

To meet the considerably increased demands for gas it has been necessary to enlarge the manufacturing plant, and further extensions are at present under consideration. In addition, certain high pressure mains laid in 1922 and 1930 must be enlarged at the earliest opportunity, and greater storage capacity is required in the outer areas. Capital expenditure in the past has been carefully husbanded; the capital spent represents £286 per million cu.ft. sold—an exceptionally low figure. The Board is confident that all expenditure now under consideration will result in a further improvement in the services rendered by the Company to its consumers.

Very many difficulties have had to be faced during the past years, and we must thank the Managing Director, Mr. H. J. Woodfine, the Engineer, Mr. C. H. Woodfine, and all officials and employees for their untiring efforts and willing co-operation, without which those difficulties could not have been surmounted with such a large measure of success.

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Gas Undertakings' Results

Auckland (New Zealand) Gas Company.—From a total revenue of £556,258, including £554,718 from sales of gas, residuals, and fittings, there was a balance of £92,626 for the year ended Dec. 31, 1944. A dividend of 3% has been declared, leaving £2,578 to be carried forward, against £2,766 brought forward from 1943.

Bath Gas Company.—A final dividend of 2½%, making 5% for the year, was declared at the annual meeting on March 21. The net revenue profit for the year ended Dec. 31, 1944, was £36,845, against £38,547 for 1943, and the balance carried forward was £28,857, against £23,610 brought in. Receipts from gas sales were £352,283, compared with £332,020 for the previous year, and the cost of manufacture was £397,188 against £385,219. The Directors' report stated that the war had created an unprecedented demand for gas, and while consumers no doubt had responded to the many national appeals for economy in the use of fuel, the sales of gas in 1944 were over 25% above pre-war. It had not been possible during the war to secure any further revision in the basic price for gas, and the present basic prices did not permit the payment of a dividend at a higher rate than 5% per annum, nor did they allow of the payment of co-partnership bonus.

Cheltenham and District Gas Company.—A final dividend of 2½%, making 5% for the year, was declared at the annual meeting of the Cheltenham and District Gas Company on Mar. 27. Total revenue for the year to Dec. 31, 1944, was £409,202, and £18,897 was carried to profit and loss account, against £28,862 for the previous year. Gas sales totalled 5,428,767 therms, compared with 4,911,604 therms in 1943, and 3,886,734 therms for 1940. Major Julian Day, Chairman, in moving the adoption of the report and accounts, said industrial sales amounted to only 14.27% of the entire output. It was therefore primarily the increased demand for gas for domestic purposes which accounted for the large increase in sales, and this, he thought, was rather exceptional among the larger companies. The output for 1944 was 62% above that for 1938, and 11% over 1943. The linking up of the Company's mains with those of the Gloucester Company had relieved them to a considerable extent of difficulties arising from lack of adequate storage capacity, which dated back to the damage incurred at the works in December, 1940. To meet the continued exceptional demand at peak load periods, however, it had become necessary to install an additional carburetted water gas plant with a capacity of 1,500,000 cu.ft. per day.

Eastbourne Gas Company.—Profit on revenue account and interest on investment and loan in 1944 amounted to £21,397, and after paying interest on Debenture stock and temporary loans, income tax, &c., amounting to £14,490, the net loss of £43,122 brought forward from 1943 was reduced to £36,215. The Directors cannot recommend the declaration of dividends on the Preference and Ordinary stocks. In a statement issued with the report, Mr. Frank H. Jones, Chairman, reviews the Company's affairs for the past five years and points out that Eastbourne has suffered more enemy attacks than any other town in the south-eastern region. In 1940, owing to evacuation, most of the hotels and boarding houses were closed down, schools were removed to other parts of the country, and many important business houses and restaurants were unable to remain open. A Government Order prohibited visitors and non-residents from coming into the district, and the population was reduced to about a third of the normal. At one period the quantity of gas supplied for civilian requirements was 52% less than in 1938, and even for 1944 the consumption was 27.73% below the 1938 figure. Increased costs of coal, labour, and materials compelled the Directors to seek permission to increase the price of gas, with the result that the pre-war price of 10.3d. per therm has now become 18.5d. per therm. The Directors are confident that Eastbourne will in course of time recover from the effects of the war and maintain its position as a holiday resort, when the Company will no doubt both contribute to, and share in, the future prosperity of the town.

Lea Bridge District Gas Company.—The report and accounts for 1944 are accompanied by a summary of the results for the four preceding years which shows that the balance carried to net revenue account increased from £36,302 in 1940 to £40,407 in 1943, and rose further to £56,411 last year. The accounts are in the revised form suggested by the panel of London gas company accountants, and they show that receipts from gas sales were up by about £4,700 compared with 1943. During the first three years of the war the domestic consumption of gas was reduced by evacuation, but an increasing quantity was sold for industrial purposes and by 1942 the output was above pre-war level. Since then the sales of gas have continued to increase, and new records for output were set up in 1943 and again in 1944. Enemy action caused substantial damage in the Company's area, and on one occasion serious damage was caused to the works, but the manufacturing plant was quickly restored to working condition and, with assistance from other gas undertakings, the demand was met satisfactorily. In addition to Preference dividends at standard rates, a dividend at the rate of 7¼% per annum has been declared on the Consolidated Ordinary stock in respect of the half-year to Dec. 31, against a dividend at the rate of 8½% per annum for the half-year to June 30.

Londonderry Gaslight Company.—New records for sales of gas and residuals were set up in 1944, gas sales at 277,873,300 cu.ft. bringing in £73,194. From a total revenue of £108,199 a balance of £2,745 was carried to profit and loss account after allowing £5,000 to meet the cost of future renewals and £1,000 for war damage contribution. Final dividends of 5% on the old shares (making 10% for the year) and 3½% on the new shares (making 7%) have been declared and the carry-forward has been increased by £386 to £12,664. A new carbonizing unit has been brought into production, and the Directors are hopeful that other new plant installed at the request of the Ministry of Fuel and Power will prove an added source of income during the coming year.

Newport (Mon.) Gas Company.—The revenue account shows a profit for 1944 of £51,983, and a final dividend of 2½% has been declared, making 5% for the year. A summary of the accounts for the years 1940–43 issued as a supplement to the 1944 report and accounts shows that gas sales over the past five years have risen as follows: 1940, 2,801,074 therms; 1941, 4,716,835 therms; 1942, 5,666,022 therms; 1943, 5,866,461 therms; 1944, 6,300,059 therms. Dividends remained steady throughout the period, but the carry-forward increased from £4,949 in 1940 to £13,907 in 1943, and fell slightly to £12,245 in 1944. Consumers now total 20,452, of whom 15,529 use prepayment meters.

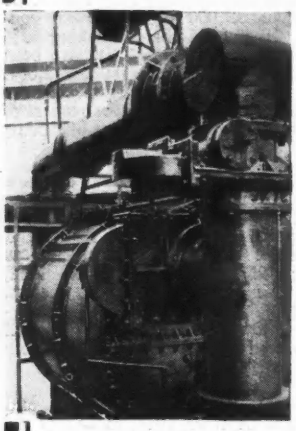
Perth (Western Australia) Gas Department.—The report and accounts for the twelve months ended Sept. 30, 1944, show that gas sales amounted to 665,968,488 cu.ft., compared with 621,365,136 cu.ft. for the previous year. The average make per ton was 18,318 cu.ft., or 88.35 therms, and the maximum daily output was 2,460,000 cu.ft. on Aug. 5. Meters in use increased by 1,137 to a total of 34,671. Gross profit was £98,100, compared with £85,784 for 1943. A statistical analysis for the period from 1912 to 1944 indicates the steady growth of the undertaking. In 1914, 2,772 consumers purchased 79,469,100 cu.ft. of gas; in 1924 there were 5,664 consumers and gas sales amounted to 142,812,200 cu.ft. By 1934 the number of consumers had increased to 18,938 and sales reached 309,497,200 cu.ft.

Shirebrook and District Gas Company.—Profit for the year to Dec. 31, 1944, was £8,192, and a final dividend has been paid of 4½%, making 7% for the year, leaving a balance of £7,056 to be carried forward, against £7,271 brought in. Gas sales during the past four years have shown a progressive increase on pre-war figures, and although most of the gas is obtained in bulk from the Grassmoor Colliery coke ovens, it has been necessary from time to time to use the gas-works plant to satisfy the abnormal demand.

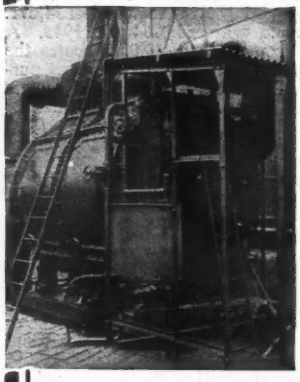
Rushden and Higham Ferrers District Gas Company.—Final dividends making 14½% on the original Ordinary stock and £10 3s.% on the additional ordinary stock were declared at the annual meeting on Mar. 26. A balance of £18,168 was carried forward. Mr. J. Roe, Chairman, reported that the business of the Company had been satisfactory despite war conditions, and to meet the extra load considerable improvements and additions had been made to the works plant. Although coal and other materials had increased in price, the Company had not made any increase in the price of gas since January, 1940.

Stretford and District Gas Board.—The lifting of the ban on the publication of public utility results reveals a fine record of progress at Stretford during the war years. The report and accounts for the year ended Mar. 31, 1944, records total gas sales of 9,586,427 therms, an increase of 41.3% over the last complete pre-war year, notwithstanding an increase of only 1.3% in the number of consumers. In the year ended March, 1940, 56.22% of the gas sold was for industrial purposes, and this has increased to 62%. Daily total consumption last year ranged from a maximum of 39,020 therms to a minimum of 12,460 therms. The average consumption per domestic consumer was 94.27 therms in 1944, compared with 88.43 therms in 1943. Of the increased sales for the year, amounting to 102 million cu.ft., an additional 54 million cu.ft. was taken by industry. The balance carried to net revenue account last year was £158,178, compared with £130,028 for the year ended March, 1943, and only £56,007 for 1940. In his report for each of the intervening war years Mr. James Carr, Engineer, General Manager, and Clerk, refers to the general decline in coal quality, and his latest report mentions many instances of whole consignments containing as much as 30% inert matter. "From this state of affairs," he says, "there is no redress under war conditions; it is a matter of 'take it or leave it'; the higher the price the lower the quality." He adds that 70% of his present difficulties are due to shortage of suitable labour, and as the war lasts, each winter period becomes more and more difficult.

When a Joint leaks—



"Permac" Joints in a Gas Works.



"Permac" Joints in a Gas Works.

Consider the loss in output while the plant is shut down and the joint is being re-made.

"Permac" the original Metal-to-Metal jointing makes leak-proof joints that last till you want to break them down. Stands up to all temperatures and pressures. Equally successful on steam, gas, water, oil joints.

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METAL-TO-METAL JOINTING MATERIAL

Sole Manufacturers:

THOMAS & BISHOP LTD

(formerly of 37, Tabernacle Street, London, E.C. 2)

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Products Prices—Stocks and Shares

The London Market April 9.

As from March 5, by the Coal Tar Products Prices Order, 1945 (S. R. & O. 1945, No. 229), the maximum price of Pitch for briquetting has been increased to 60s. per ton f.o.r. supplying works, and the prices for Road Tar, as fixed by the Coal Tar Products Prices Order, 1943, S. R. & O. No. 1528, have been increased by one half-penny per gallon. There is also an increase of 5s. per ton in the price of standard Creosote/Pitch Mixture.

The prices of other products are unchanged.

Control of Benzole and Coal Spirit Order, 1944 (S.R. & O. 1944, No. 172), is in force.*

By this Order the price of Motor Benzole is fixed at 2s. per gallon. The Order also lays down the method of evaluating Crude Benzole, and calls for periodical returns to the Ministry of Fuel and Power from all producers of Crude and Refined Benzole.

Control of Toluene (No. 4) Order, 1944 (S. R. & O. 1944, No. 170), contains an amendment of the Control of Toluene (No. 3) Order, 1943.

There is also the Control of Benzole and Coal Spirit (No. 2) Order, 1944 (S. R. & O., No. 988).

Coal Tar Products Prices (No. 2) Order, 1944 (S. R. & O., 1944, No. 1051), allows increases in the maximum prices for all forms of Naphthalene.

* Slightly amended by Control of Benzole and Coal Spirit (No. 2) Order. 1944.

The Provinces April 9.

The average prices of gas-works products during the week were: Pitch and Crude Tar,* Toluole, naked, North, 90's, 2s. to 2s. 2½d., pure, 2s. 9d. (now controlled by S. R. & O. 1944, No. 988, operative from Sept. 1, 1944. Benzole and Coal Spirit, also Coal Tar Naphtha and Xylole, are now controlled by the Control of Benzole and Coal Spirit Order, 1944, dated Feb. 18, 1944, S. R. & O. 1944, No. 172, operative from March 1, and S. R. & O. 1944, No. 988, part 1, operative from Oct. 1, 1944, Carbolic acid, 60's, anthracene, creosote oil (hydrogenation), coal tar oils (timber preservation, &c.), and strained anthracene oil controlled by the Coal Tar Products Prices Order, 1943, dated Oct. 20, 1943 (S. R. & O. 1943, No. 1528), operative from Nov. 15, 1943, Naphthalene now controlled under S. R. & O. 1944, No. 1051, operative from Sept. 22, 1944.

Attention is called to Coal Tar Products Prices Order, 1945 (S. R. & O. 1945, No. 229), referred to on p. 305, "JOURNAL" of March 7.

* In regard to pitch and crude tar prices we would ask readers to refer to the editorial note on p. 396 of the "JOURNAL" for Sept. 10, 1941.

Scotland April 7.

Home market continues active. Refined tar*: Yield to Distillers is 5d. per gallon *ex* Works, naked. Creosote oil: Timber preserving quality,* 5½d. to 6½d.; hydrogenation oil,* 5⅞d.; low gravity or virgin oil,† 7¼d. to 7½d.; benzole absorbing oil,* 6½d. to 8d. per gallon. Refined cresylic acid* is 3s. 6d. to 4s. 6d. per gallon *ex* Works, naked, according to quality. Crude naphtha†: 6½d. to 7d. per gallon. Solvent naphtha*: Basic prices delivered in bulk, 90/160 grade, 2s. 8d., and 90/190 Heavy naphtha, Unrectified, 1s. 10½d.; Rectified, 2s. 2d. per gallon. Pyridine†: 90/160 grade, 13s., and 90/140 grade, 15s. per gallon.

* Price controlled. † Uncontrolled.

The very favourable war news gave a fillip to prices in the stock markets last week. Re-investment support caused the gilt-edged section to harden and a number of good features occurred among industrials.

The steady demand for Gas stocks and shares continued, and prices remain very firm. Apart from the increase of 6½ in Imperial Continental there were few changes in the Official List, but it will be seen that several sharp rises were recorded in the Supplementary and Provincial Lists, notably Mid-Southern Utility "A" with a gain of 10 points and the three Great Grimsby stocks, all of which closed 15 points higher.

The full list of changes on the week were as follows:

OFFICIAL LIST		
Gas Light 3½ p.c. Red. Deb.	99—101	+1½
Imperial Continental Ord.	117—120	+6½
South Metropolitan Ord.	94—97	+1
South Suburban 4 p.c. Pref.	100—105	+2
United Kingdom Gas Corporation Ord.	23/6—24/6	+-/3d.
Ditto 3½ p.c. Red. Deb.	97—102	−1
SUPPLEMENTARY LIST		
Brighton 5 p.c. Deb.	123—128	+1
Mid-Southern Utility "A"	115—120	+10
PROVINCIAL EXCHANGES		
Blyth Ord.	124—126	+7
Derby Cons.	135—140	+5
Great Grimsby "A"	175—185	+15
" " "B"	175—185	+15
" " "C"	165—175	+15
Sheffield Cons.	150—152	+1

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SPENT OXIDE BOUGHT.

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ROBERT DEMPSTER & SONS, LTD., ELLAND, Builders of CARBONIZING PLANTS, both Horizontal and Vertical. Manufacturers of CONDENSERS, PURIFIERS, GASHOLDERS, &c., also every description of COAL and COKE HANDLING PLANT. *Telegrams:* "Dempster, Elland." *Telephone:* Elland 2241, 2242 and 2243.

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MANUFACTURERS of Gasholders, Tanks, Condensers, Purifiers, Scrubbers, Washers, and every description of Gas Plant.

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FULL particulars of these spaces can be obtained on application to the Publishers. They are designed principally for the use of the firms whose display advertisements cannot be included owing to paper rationing.

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BRITISH VACUUM CLEANER AND ENGINEERING CO. LTD.
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ASSISTANT DISTRIBUTION ENGINEER

APPLICATIONS are invited for the above position from trained engineers (preferably about 35 years of age) having extensive experience in main and service work of all types, both practical (particularly control of mainlaying operations on site) and theoretical.

Experience in meter and appliance workshop control very desirable. State professional qualifications in gas supply and civil engineering, age, present and previous appointments, and precise position in regard to military service and Essential Work Order.

Testimonial required from present employer, and names only of two other Referees.

Salary £600 per annum according to ability, plus current war bonus (at present about 10%). Excellent prospects for the right man.

The appointment will be subject to the passing of a medical examination and membership of the Company's Contributory Pension Scheme, and will be terminable on a month's notice on either side.

Apply to the Chief Engineer, 30, Grainger Street, Newcastle-on-Tyne, 1.

EAST HULL GAS COMPANY

WORKS SUPERINTENDENT wanted.—Applicants must have a thorough theoretical and practical knowledge of Vertical Retorts, Water Gas Manufacture, Purification, Benzole and Liquor Plants. Mechanical qualification an advantage. Able to guide and control men. Salary £400 per annum, House, Coals and Gas. Permanent position for suitable applicant.

Applications, stating Age, Training, Qualifications, Experience, present position and position under National Service Acts and Essential Works Order, accompanied by *copies* of recent Testimonials, endorsed "Works Superintendent," to be addressed by April 24, 1945, to T. W. T. Hammerton, Manager, East Hull Gas Company, St. Mark Street, Hull.

ASSISTANT to Accountant and Office Manager. Opportunity for single man with accountancy knowledge on 2-3 year contract in Malta. Health aspect is of importance. Commencing Salary £370 per annum. Write "L.M.," c/o Streets, 110, Old Broad Street, E.C. 2.

BOROUGH OF LOUGHBOROUGH

(GAS DEPARTMENT)

APPLICATIONS are invited for the Position of TECHNICAL ASSISTANT (temporary, with minimum twelve months' guaranteed employment), with practical experience in the chemical control and operation of vertical retorts. Applicants must also be capable of carrying out Gas-works routine tests.

The commencing Salary is £280 per annum plus war bonus (at present £59 16s.).

Applications, endorsed "Technical Assistant," showing Age, Training, Experience and Position under the National Service and Essential Works Orders, should be forwarded to the undersigned not later than Wednesday, April 25, 1945.

Town Hall, Loughborough. A. GWYNNE DAVIES, Town Clerk.

April 6, 1945.

OXFORD GAS COMPANY

SHIFT ENGINEER

APPLICATIONS are invited for the above position at a commencing Salary of £350 per annum inclusive of War Bonus. The following qualifications are essential:

Practical Training in Gas Engineering.

Technical Education to the standard of the Higher Grade Examination of The Institution of Gas Engineers.

Experience in the operation of Horizontal Retorts and Water Gas Plant.

Applications and Testimonials to be addressed to:

The Oxford and District Gas Company, Oxford. ALEXANDER TRAN, General Manager and Chief Engineer.

BOROUGH OF NELSON

(GAS DEPARTMENT)

APPOINTMENT OF DEPUTY GAS ENGINEER

APPLICATIONS are invited for the above Position. Salary will be at the rate of £459 16s. per annum (inclusive of present cost of living bonus).

Applicants must be fully qualified and have a thorough training with practical experience of modern gas manufacture and Works management.

A good, sound experience in Drawing Office practice will be an advantage.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination. The appointment will be terminable by six weeks' notice on either side.

Applications, stating Age, Qualifications, and Experience, and accompanied by *copies* of three recent Testimonials, must be delivered to the undersigned not later than Wednesday, April 25, 1945.

Town Hall, Nelson, Lancs. F. W. ROBERTS, Town Clerk.

April 7, 1945.

COUNTY BOROUGH OF BELFAST

ASSISTANT DISTRIBUTION SUPERINTENDENT

APPLICATIONS are invited for the Position of ASSISTANT DISTRIBUTION SUPERINTENDENT in the Gas Department.

Candidates, who must not be over 40 years of age on May 1, 1945, should have a thorough knowledge and sound practical experience of the Distribution and Sale of Gas both for Domestic and for Industrial purposes, and of the organization and control of the Distribution Section of a large Gas Undertaking, and have obtained the Higher Grade Certificate of The Institution of Gas Engineers in Gas Engineering (Supply).

The Salary for the office is £400 per annum, rising, subject to satisfactory service, by annual increments of £25 to £500, plus War Bonus, at present £59 16s. A higher commencing Salary may be paid in the case of a person possessing special qualifications.

Form of Application and Conditions of Appointment may be obtained from the Engineer and Manager, Gas-Works, Ormeau Road, Belfast. Applications, with *copies* of three recent Testimonials, should be lodged in the office of the undersigned not later than 4 p.m. Friday, May 11, 1945.

Canvassing for the appointment in any form, oral or written, direct or indirect, will render a candidate liable to disqualification for appointment.

City Hall, Belfast. JOHN DUNLOP, Town Clerk.

April 4, 1945.

PLANT &c. FOR SALE & WANTED

'PHONE 98 STAINES.

FOR SALE.—Briggs Vertical Gas Fired Boiler, 6 ft. 6 in. by 3 ft.; 30 h.p. H.S. Enclosed Steam Engine; Calorifier, 7 ft. by 3 ft.; Marshall Horizontal Steam Engine, 10 in. by 14 in.; Cylindrical Tank, 17 ft. by 6 ft.; Rectangular Tank, 26 ft. by 10 ft. by 8 ft.

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FOR SALE.—Two Modern Type PURIFIERS, 40 ft. by 22 ft. by 4 ft. 9 in., by Walker's. Capacity approximately three million feet per day complete. In excellent condition. For prompt delivery. Mayer Newman & Co., Ltd., 15, Arundel Street, London, W.C.2.

FOR SALE.—(Immediate disposal.) Set of four DRY PURIFIERS, each 10 ft. square by 5 ft. deep, set in line, and fitted with dry luted covers, complete with 8 in. dia. valves and connexions.

Apply to the Gas Engineer, Gas Works, New Mills, near Stockport.

FOR SALE.—The following PUBLIC LIGHTING EQUIPMENT: 200 Sq. Lanterns with Horstmann Controllers and 200 assorted Lamp columns. Inspection invited. Cleethorpes Gas Company.

WANTED. — Quantity of BLACK COOKERS suitable for renovation. Send particulars in confidence to No. 9425, "GAS JOURNAL," 51, High Street, Esher, Surrey.

BARNOLDSWICK URBAN DISTRICT COUNCIL

(GAS DEPARTMENT)

WANTED.—VERTICAL BOILER, minimum capacity 3,000 lb. per hour, complete with all mountings and fittings. Particulars, including price, latest Insurance Report and where available for inspection to J. H. Green, Engineer and Manager.

SIDMOUTH URBAN DISTRICT COUNCIL

(GAS DEPARTMENT)

THE above Council have for sale the following WATER PUMPS :

Two 2nd H. Vertical treble ram water pumps. Maker, Frank Pearn & Co., Manchester. Diam. of rams 2¾ in., length of stroke 4 in., diam. of connexions 2 in. Motor driven with gearing. Motors 3 h.p., 400 volts A.C., 3-phase, 50 cycles. Starters, "Memota." Approx. capacity 1,000 gall. per hour.

Further particulars can be obtained from the Gas Engineer and Manager, Gas-Works, Sidmouth.

Offers in sealed envelopes marked "Plant" must be received by the undersigned not later than noon on Tuesday, April 24, 1945.

Council Offices, Sidmouth. R. PICKARD, Clerk of the Council.

April 5, 1945.

CONTRACTS OPEN

BOROUGH OF BRIGHOUSE

(GAS DEPARTMENT)

TENDERS are invited for the RESETTING of RETORTS at the Corporation's Gas-Works.

Specifications and all particulars may be obtained on application to the Gas Engineer, Mill Lane, Brighouse.

Tenders in plain, sealed envelopes, endorsed "Resetting," should be delivered to the undersigned not later than the first post on Saturday, May 19, 1945.

Town Hall, Brighouse. ERNEST H. CLEGG, Town Clerk.

April 5, 1945.

NEW MILLS URBAN DISTRICT COUNCIL

(GAS DEPARTMENT)

CLEANING AND PAINTING OF ONE GAS HOLDER

TENDERS are invited from recognized painting contractors for the CLEANING AND PAINTING of one Spirally Guided GASHOLDER of two hundred and fifty thousand cubic feet capacity in steel tank, at the Council's Gas-Works, Mousley Bottom, New Mills.

Specifications and Conditions of Contract may be obtained on application to the Gas Engineer, Gas-Works, New Mills, near Stockport.

Tenders, on the prescribed form, to be returned to the undersigned at the Town Hall, New Mills, near Stockport, not later than 12 noon on April 23, 1945.

JOHN WALTON,
March 29, 1945. Solicitor and Clerk to the Council.

COUNTY BOROUGH OF BURNLEY

(GAS DEPARTMENT)

TENDERS are invited for the supply, delivery and erection of a LANCASHIRE STEAM BOILER complete with Economizer, Superheater and all necessary fittings.

Further particulars and Specification may be obtained from the Engineer and Manager, Gas Offices, Parker Lane, Burnley.

Offers may also be considered for a Second-hand Boiler and equipment complying with the terms of the Specification.

Tenders in plain sealed envelopes endorsed "Steam Boiler" to be received by me not later than May 5, 1945.

ARCHIBALD GLEN, Town Clerk.

CITY OF MANCHESTER

THE Gas Committee invites Tenders for the work and materials required in the CONVERSION OF PURIFIERS at the Bradford Road Gas-Works from Wet Lute to Dry Lute.

Particulars and Form of Tender may be obtained from Mr. J. H. Cadman, Commercial Manager and Secretary, Gas Department, Town Hall, Manchester, 2.

Sealed Tenders in the envelope provided, addressed to the Chairman of the Gas Committee, endorsed "Conversion of Purifiers, Bradford Road Works," must be delivered at the Gas Office, Town Hall, Manchester, 2, not later than 10 a.m. on Tuesday, April 17, 1945.

The Committee does not bind itself to accept the lowest or any Tender.

Town Hall, Manchester. PHILIP B. DINGLE, Town Clerk.

April, 1945.

BRIDGNORTH CORPORATION GAS DEPARTMENT

TENDERS are invited for the Supply, Delivery and Erection of a set of CAST IRON PURIFIERS, 20 ft. by 15 ft. by 5 ft. 6 in. deep, also for PRE-HEATER of 500,000 cu.ft. capacity per day.

Specifications, drawings, and form of Tender may be obtained from the Gas Engineer, Mr. E. H. Hart, M.I.G.E., Gas-Works, Friar Street, Bridgnorth. Tenders in plain sealed envelopes, endorsed "Purifiers," to be received by me not later than the first post on Monday, April 30, 1945.

The Council do not bind themselves to accept the lowest or any tender.

College House, Bridgnorth, Shrops. J. RISEBOROUGH, Town Clerk.

April 5, 1945.

MISCELLANEOUS

COOKER RENOVATION.—London Company fully experienced in this class of work invites enquiries from Engineers faced with the old black cooker problem.—Address No. 9426, "GAS JOURNAL," 51, High Street, Esher, Surrey.

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Telegrams: "Purification, Stock, London." Telephone: London Wall 5377

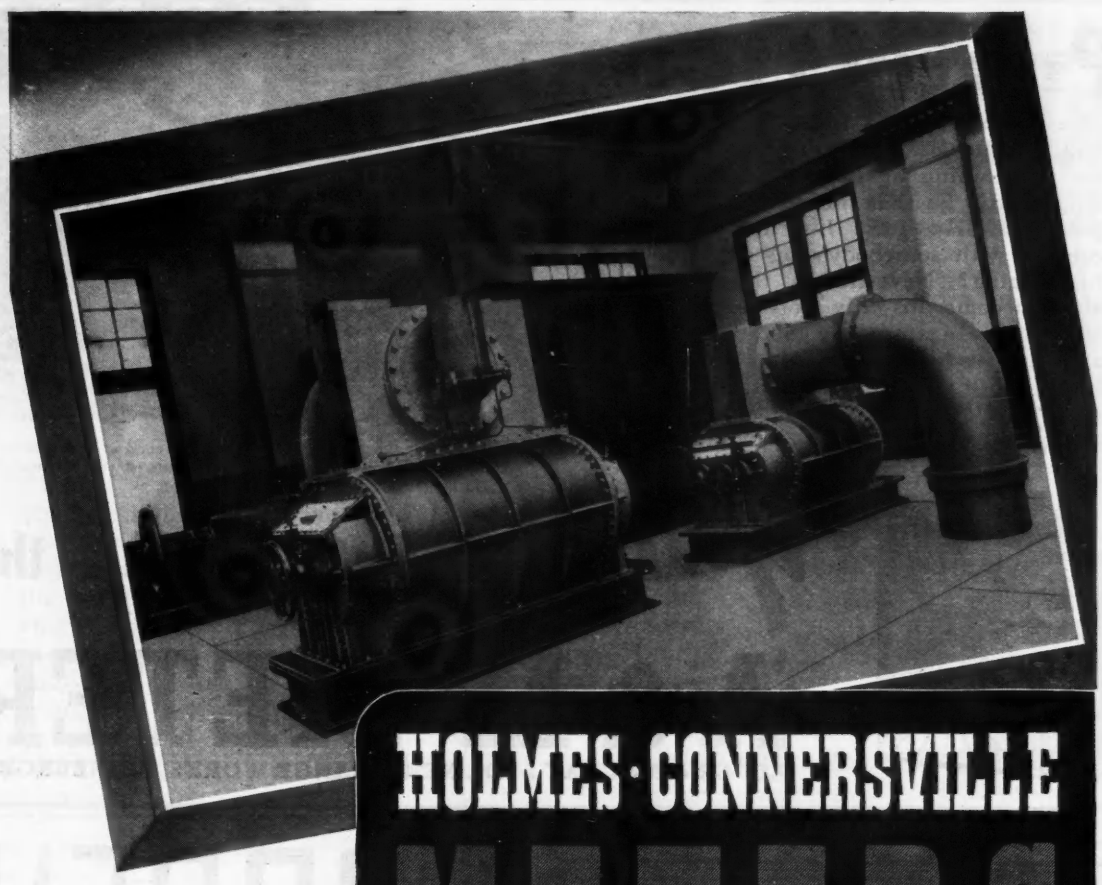

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Illustration shows two station meters at a Scottish Gasworks having capacities of 8 and 11 million cu. ft. of gas per day respectively.

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The Hermit Crab is literally "a poor fish," and for all we know, he may be responsible for the coining of that well-known phrase. Apparently he has neither brains nor—to put it vulgarly—guts! Else how could he be content with somebody's discarded abode as his lodging? Nevertheless, this "discarded" abode becomes his only protection (and a very efficient one) against the rigours of the elements and against his natural enemies. And this brings us to the point of this short narration . . . you must have protection and that protection must be efficient. Obviously, then—

HERMIT CRAB. A variety of crab that lives in mollusc's cast-off shell to protect its shell-less hinder parts.

your protection is the

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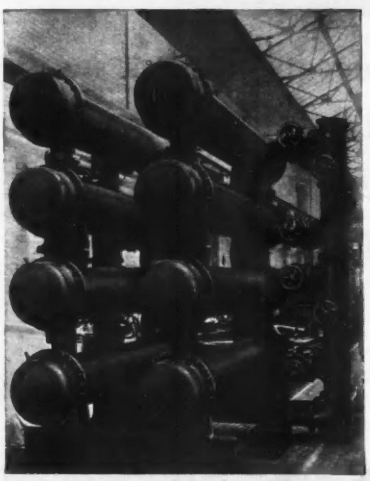

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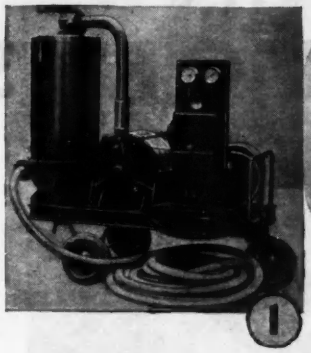

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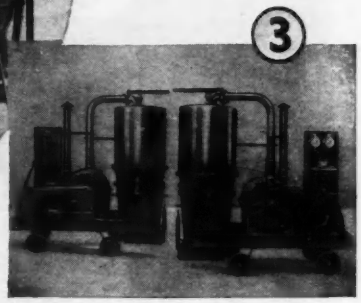

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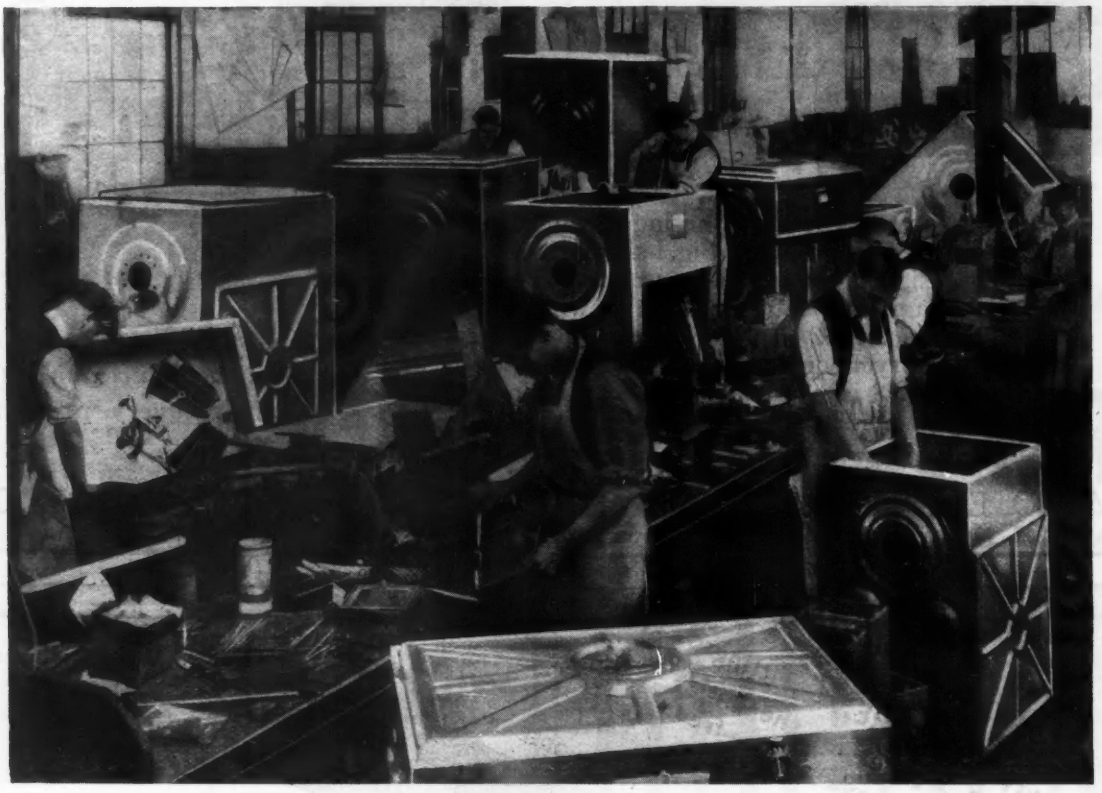

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CARBURETTED WATER GAS

FOR OTHER APPLICATIONS:

HYDROGEN (By Steam-Iron or Catalytic Processes)

CARBON MONOXIDE

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● The Gas making Plants for using COKE (including both blue and carburetted water gas) supplied by us in the last 10 years alone have a nominal rated capacity of over 2,000,000 TONS of COKE ANNUALLY

This excludes the very large number of installations since 1940 specially for emergency purposes

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SPECIALISTS IN DESIGN AND CONSTRUCTION OF PLANTS FOR THE GAS INDUSTRY

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- GASHOLDERS
- CONDENSERS
- WASHERS
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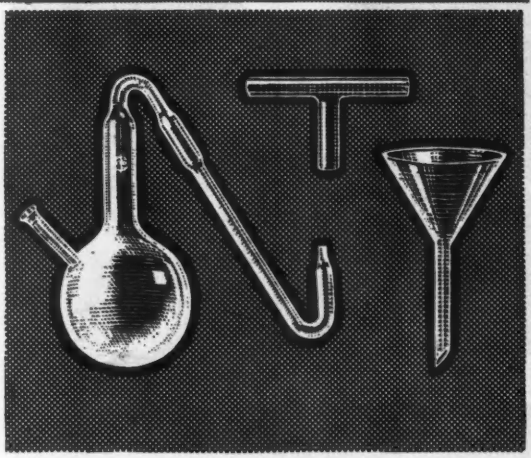

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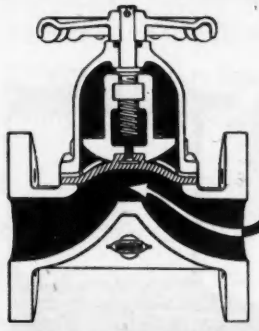

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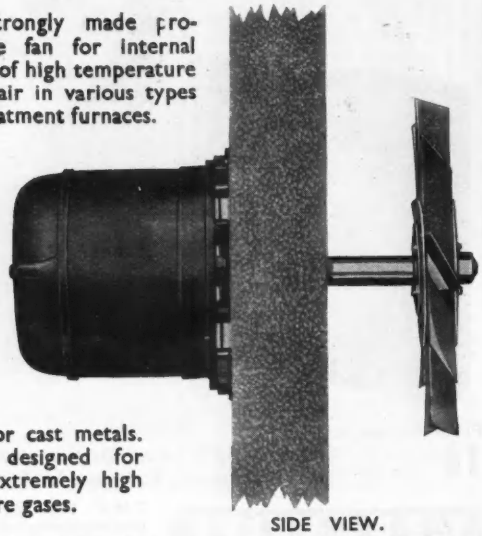

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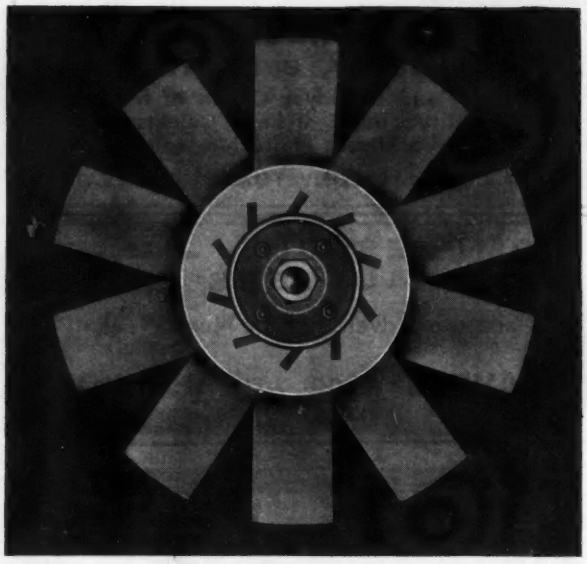

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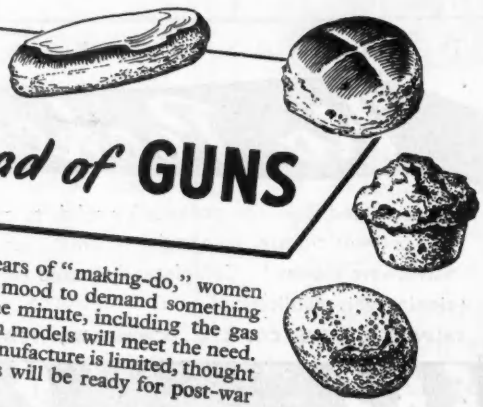

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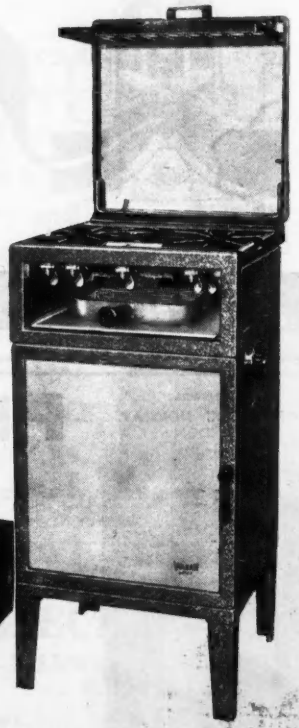

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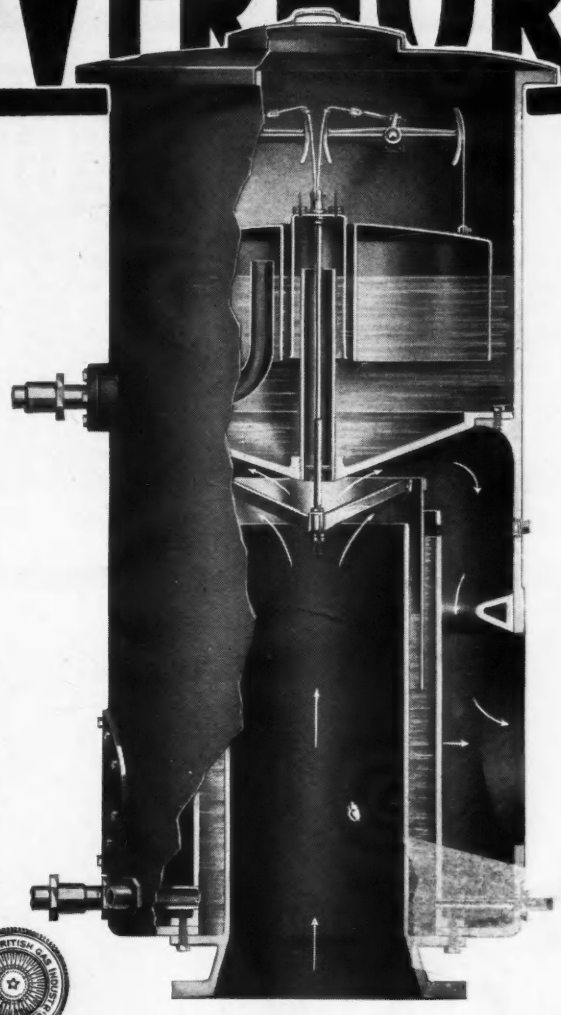

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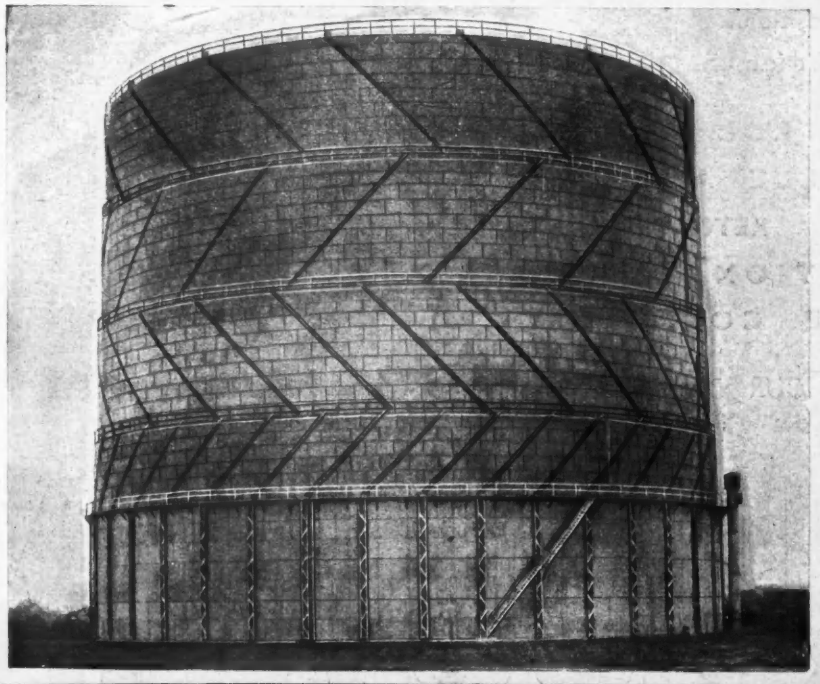

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